VOL. 3 JULY • 1946 NO. 3

THE FOCAL SPOT

Fourth Dominion Convention
Niagara Falls, Ontario
Sept. 26, 27, 28.

CANADIAN SOCIETY OF RADIOLOGICAL TECHNICIANS
SCIENTIA ET MORES

JOURNAL OF THE CANADIAN SOCIETY OF RADIOLOGICAL TECHNICIANS

Dipping for "dope"...

PICTURED here is the floor above one of the great stainless steel tanks in which cellulose esters and solvents are thoroughly mixed. These ingredients form a viscous syrup or "dope" used in making the crystal-clear safety base for Du Pont Safety X-ray Film. Numerous test samples of each batch of "dope" are obtained by dipping into the cavernous mouths of the mixers. At the Du Pont Control Laboratories, chemists and physicists put these samples through a series of exacting tests. Specifications are rigid . . . closely watched. Thus the production of the "dope" for Du Pont Safety X-ray Film base is vigilantly checked and controlled.

No matter how fine the emulsion, the base must excel if highest quality radiographs are to result. The test shown here is one of many used by Du Pont—the *originator of blue safety base*—to assure the clarity demanded by the careful radiologist.

Canadian Representative: Canadian Industries Limited, Photo Products, Plastics Division, Toronto, Ont.

Du Pont X-ray Film and C-I-L Developing, Fixing and Replenishing Powders are sold by leading distributors from coast to coast.

CANADIAN INDUSTRIES C-I-L LIMITED

PL-46-8

Clear and dependable cholecystograms with...

TRADE MARK

'STIPOLAC'

BRAND

'Stipolac' Sodium Tetraiodophenolphthalein Combined with Acidifier gives a high percentage of clear cholecystograms because:
1. the special acid mixture insures complete precipitation of the dye as a finely divided suspension; 2. this facilitates ready absorption of the dye from the lower duodenum, with a minimum of gastro-intestinal irritation; 3. the high purity of the dye provides further assurance of satisfactory results.

HOW SUPPLIED

'Stipolac' Sodium Tetraiodophenolphthalein Combined with Acidifier in bottles of 3.5 gm. and 5 gm.

BURROUGHS WELLCOME & CO.
(The Wellcome Foundation Ltd.)
MONTREAL
ASSOCIATED HOUSES: LONDON · NEW YORK · SYDNEY
CAPE TOWN · BOMBAY · SHANGHAI · BUENOS AIRES

When writing Advertisers kindly mention this Journal.

News Items from the Provinces

ALBERTA SOCIETY OF RADIOLOGICAL TECHNICIANS

EDMONTON BRANCH

The Alberta Executive met in Calgary July 14 at the Colonel Belcher Hospital. Ammendments to the Provincial Constitution were passed and the Dominion Convention preparations were discussed.

Afterwards the Edmonton members were entertained by the Calgary Society.

—F. DYLKE,
Sub-Editor.

CALGARY BRANCH

The members of the Calgary Society are showing much interest in forming a study course for student technicians. The majority of the members find it diffcult to write exams on Therapy without actually working with this branch of Radiology. It is with this thought in mind, that we are arranging for actual study groups to be held this fall. Such groups would not be limited to therapy only, nor would they exclude any regular members from attending.

This discussion was brought on as a result of the examinations written in April by eight of our members.

Also in April we had a visit from our Provincial President, Mr. Godwin. Although he was unable to stay in Calgary for our regular monthly meeting, he did visit members of the society while at work. During his visit, plans were started for the annual Provincial Convention, which for the past three years has had to be cancelled due to lack of transportation. Much of the discussion time at our meetings has since been given over to making arrangements for the 1946 convention, but once again this has been cancelled, this time because of road conditions.

Following the discussion of business, we have had very interesting and helpful talks at our meetings, by Dr. Porter and Major Bell.

—M. B., Calgary
Sub-Editor.

BRITISH COLUMBIA SOCIETY OF X-RAY TECHNICIANS

No meetings of our society are being held during the summer months. So many of our members are on holiday that it was decided that interest in our meetings might lag and attendance fall off owing to the fine weather.

We are holding our first annual picnic on the 28th of July and we expect this to be an enjoyable event. Through the courtesy of Mr. Wick Eccles two large motor boats have been hired and these will accommodate about seventy people. We are hoping that this will prove to be an event of outstanding merit and that it will be held annually. A lot of ground work has been done by the executive and the success of the venture will depend on the support we receive from the membership.

The first meeting of the society will be held on the second Thursday in September. at which time plans for sending a delegate to the convention will have to be made. It is essential that all members lend their support in selecting the delegate so we are hoping for a full turnout.

Mr. Wick Eccles has left the employ of the Ferranti Company and is at present having a well earned rest. The good wishes of all our members are extended to Mr. W. Eccles who has a host of friends in our society.

Mr. Stabler has arrived from the east to take over the position formerly held by Mr. Eccles. Mr. Stabler assures me that he will attend our meetings and hopes to meet all our members.

The new Victor Unit has been installed in Shaughnessy Hospital and is a very useful addition to a very busy department. Approximately one hundred patients go through the department daily.

We hope that everyone will have enjoyable and health-giving vacations. Let us make the B.C. Society a success by attending the meetings whenever possible.

—W. Q. STIRLING, R.T.,
President.

"Screen Test" for Cassettes

Described in screen care booklet "Minutes that Matter" available on request to Patterson Screen Division, Towanda, Pa. Your dealer can help you.

DU PONT

HAVE YOUR CASSETTES HAD A "SCREEN TEST" LATELY?

IN RADIOGRAPHY, as in Hollywood, "screen tests" are important.

The sharp, easy-to-read radiographs of the high diagnostic quality possible with Patterson Screens can *only* be produced when intensifying screens and film are held in perfect contact in the cassette.

So your cassettes should be given a "screen test" regularly.

Stained or damaged screens should be replaced with new Patterson Screens. Your dealer has a complete stock. Patterson Screen Division of E. I. du Pont de Nemours & Co. (Inc.), Towanda, Pa.

31 Years' Leadership Through Quality

Patterson Screens

The Standard of Screen Quality

BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

When writing Advertisers kindly mention this Journal.

News Items from the Provinces

NEW BRUNSWICK SOCIETY OF X-RAY TECHNICIANS

A regular meeting of the New Brunswick Society of X-Ray Technicians was held at St. Joseph's Hospital, Saint John, N.B., at 8.15 p.m. on April 25, 1946. The acting President, Miss Katherine Creelman, occupied the chair. There were 14 members and one guest present.

The minutes of the last meeting were read and approved. After a discussion re the Annual Meeting it was decided to hold it on June 22nd, in Saint John, N.B. The chairman asked the members to contribute papers or demonstrations in technique for the annual meeting programme.

After the business meeting the drawing for the lottery was held. Dr. Price, of Amherst, N.S., a guest, drew the lucky tickets. Mr. J. McCarten, Mr. O. Lingley and Mrs. T. G. Mullaley, all of Saint John, N.B., were the lucky winners of a radio, lamp and blanket in the above order. The executive is very grateful to all the members who were so generous in selling tickets and making the lottery such a success.

Following the drawing the members had the pleasure of hearing a very interesting lecture on Psychology by Dr. W. J. Fisher, Psychiatrist at the Provincial Hospital, Fairville, N.B. Refreshments were served by the technicians of St. Joseph's Hospital and the meeting adjourned at 11.00 p.m.

Miss Margaret Grant has tendered her resignation as President as she is being married in the near future. Miss Grant has fulfilled her duties very capably and we are indeed sorry to lose her. The best wishes of all in this Society are extended to her.

—J. RUSSELL MORSE, R.T.,
Sub-Editor.

NORTHERN SECTION

On Saturday evening, May 4th, 1946, a small group of technicians from the northern section of the New Brunswick Society of X-Ray Technicians gathered at the Hotel Dieu Hospital, Bathurst, N.B. In the absence of Sister St. Stanislaus, Sister Mary of the Sacred Heart acted as chairman.

Minutes of the previous meeting and the Treasurer's Report were read.

Correspondence from Sister Marie de Lourdes was read and some discussion re the annual meeting followed. No definite decisions were made concerning representation at this meeting. Since the hospitals in this section of the province are greatly understaffed and the x-ray technicians, in many instances, have duties other than x-ray alone, it is difficult to plan very far ahead.

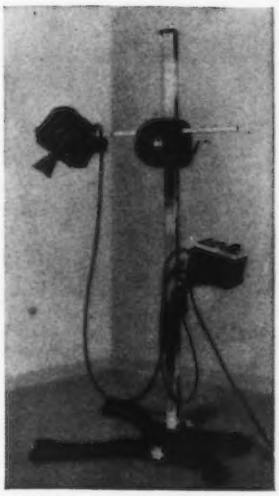
The matter of making some contributions to The Focal Spot was brought up and those present decided to send in as many questions as possible re technical problems.

A Round Table Talk was held re small technical difficulties so often encountered by the technician in the smaller hospitals and many helpful bits of knowledge were exchanged.

Refreshments were served at the close of the evening and the meeting adjourned at 10.30 p.m.

—MARY T. HOWES, R.T.,
Sub-Editor, Northern Section.

(continued on page 160)



Compact • Light Weight
Ample Capacity

KELEKET
X-RAY EQUIPMENT
A Complete Line

◀ KELEKET MOBILE PORTABLE X-RAY UNIT

Obtainable in two styles . . . table-type tubestand or mobile tubestand illustrated. Both provide many advantages of more expensive, full scale equipment. Complete range of positions, vertically and horizontally for radiography or fluoroscopy. Both tubestand give complete flexibility for the office or hospital . . . diagnosis can be confirmed right in the office or at the patient's bedside.

K-30 DE LUXE VERTICAL FLUOROSCOPE ▶

Design improvements such as elimination of the protruding carriage arm make savings of one third in floor space. The screen is universally adjustable, giving unusual freedom of movement. The Patterson High Intensity Type B Screen is 12″ x 16″ and has 14″ transverse travel, and accommodates the Keleket Outhodiagraphic attachment. Floor space required is 40″ x 48″. Height of cabinet, 76″.

CONVENTION — Meeting of the Canadian Society of Radiological Technicians at the General Brock Hotel, Niagara Falls, Ont., Sept. 26-27-28.

X-56A

Illustrated descriptive literature sent on request. Address correspondence to

X-RAY and RADIUM INDUSTRIES LTD.

261 DAVENPORT RD. TORONTO 5

313 DOMINION SQUARE BLDG. MONTREAL, QUE. | 705 LINDSAT BLDG. WINNIPEG, MAN. | ROYAL BANK BLDG. EDMONTON, ALTA.

When writing Advertisers kindly mention this Journal.

OFFICERS
Canadian Society of Radiological Technicians

President
MR. T. B. HURST
Toronto General Hospital
Toronto, Ont.

Vice-President and Secretary-Treasurer
MR. P. E. HUNT
1215 7th Ave., Saskatoon, Sask.

Board of Directors

Honorary President
DR. LEON GERIN-LAJOIE
1414 Drummond St., Montreal, P.Q.

President
MR. T. B. HURST
Toronto General Hospital, Toronto

Appointed by the Canadian Medical Association
DR. A. C. SINGLETON
Medical Arts Bldg., Toronto

Appointed by the Canadian Assoc'n. of Radiologists
DR. HILL H. CHENEY
Vancouver General Hospital
Vancouver, B.C.

Elected by the Ordinary Members
MR. P. E. HUNT
1215—7th Ave., Saskatoon, Sask.

Elected by the Member Societies
MR. HERBERT M. WELCH
Col. Belcher Hospital
Calgary, Alta.

Historian
SISTER M. ROSE AGNES
St. Joseph's Hospital, St. John, N.B.

Associate Directors

DR. A. COMTOIS
Montreal, Que.

SISTER M. MOONEY
Cornwall, Ont.

MR. C. N. GODWIN
Edmonton, Alta.

MR. W. STIRLING
Vancouver, B.C.

SISTER ST. STANISLAUS
Chatham, N.B.

MR. A. PERRY
Halifax, N.S.

MISS D. CAMPBELL
Montreal, Que.

MR. W. DOERN
Winnipeg, Man.

MR. S. JOHNSTON
Moose Jaw, Sask.

Board of Examiners

DR. E. A. PETRIE (Chairman)
St. John, N.B.

DR. W. A. JONES
Kingston, Ont.

MR. T. B. HURST
Toronto, Ont.

Board of Directors
The Focal Spot

Honorary President
MR. T. B. HURST

President
The Editor
MR. L. J. CARTWRIGHT

Business Manager
MR. W. H. OSBORNE

PRESIDENTS AND SECRETARIES
of the Provincial Societies

ALBERTA SOCIETY OF RADIOLOGICAL TECHNICIANS:

President: Mr. C. N. Godwin,
602 McLeod Bldg., Edmonton, Alta.

Secretary: Mrs. P. Kitching,
601 McLeod Bldg.,
Edmonton, Alta.

BRITISH COLUMBIA SOCIETY OF X-RAY TECHNICIANS:

President: Mr. W. Q. Stirling,
1416 West 14th Ave., Vancouver, B.C.

Secretary: Miss M. McMillan,
St. Paul's Hospital, Vancouver, B.C.

Treasurer: Miss M. Richer,
Medical Clinic, 710 Seymour St., Vancouver, B.C.

MANITOBA SOCIETY OF X-RAY TECHNICIANS:

President: Gordon Axtell,
Winnipeg General Hospital.

Sec'y-Treas.: Miss Mary Hallam
118 Medical Arts Bldg., Winnipeg.

NEW BRUNSWICK SOCIETY OF X-RAY TECHNICIANS:

President: Miss Margaret Grant,
St. John General Hospital, St. John, N.B.

Secretary-Treasurer: Sister Marie de Lourdes,
St. Joseph's Hospital, St. John, N.B.

NOVA SCOTIA SOCIETY OF RADIOGRAPHERS:

President: Miss Neva Harley, R.N.,
Halifax Infirmary.

Secretary-Treasurer: Mrs. Chester Campbell,
Halifax Infirmary.

ONTARIO SOCIETY OF RADIOGRAPHERS:

President: Mr. W. H. Osborne,
Dunlop Bldg.,
Toronto General Hospital, Toronto, Ont.

Secretary: Mr. Paul Frederick,
W.C.B., University Ave., Toronto, Ont.

Treasurer: Miss Ethel Cave, M.A.,
St. Michael's Hospital, Toronto.

PROVINCE OF QUEBEC SOCIETY OF X-RAY TECHNICIANS:

President: Miss D. Campbell.

Secretary-Treasurer: Miss M. Wheeler,
2023 Marlowe Ave. Apt. 2, Montreal 28.

Asst. Secretary-Treasurer: Sister Margaret of Jesus.

Registrar: Miss Rose Ducharme.

SASKATCHEWAN SOCIETY OF X-RAY TECHNICIANS:

President: Mr. Sidney G. Johnston,
General Hospital, Moose Jaw, Sask.

Secretary: Miss Marie Perron,
Saskatoon.

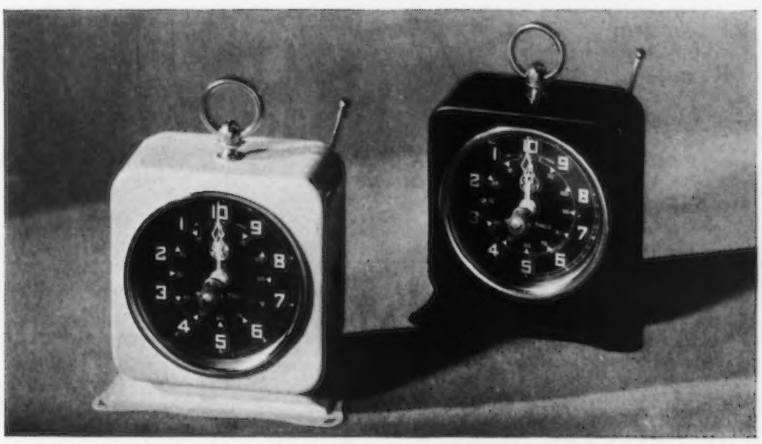
Treasurer: Miss Marie Perron,
c/o Dr. Baltzan, Saskatoon.

. . . yes, often just seconds . . . can mean the difference between good or poor x-ray film-processing results. That's equally true of many other procedures demanding exact timing—also why most technicians rate the G-E Interval Timer a "must."

Built to last, the G-E Lever-Type Mechanical Interval Timer accurately measures any preset period from 15 seconds to 2 hours. And it announces the interval's expiration by an alarm you can't ignore. The G-E Interval Timer is an "easy" instrument . . . easy to adjust, easy to read, easy on the budget—very easy to look at in its handsome black or ivory case.

No better time than today to order your G-E Interval Timer—be sure to specify black or ivory finish.

VICTOR X-RAY CORPORATION of CANADA, Ltd.
DISTRIBUTORS FOR GENERAL ELECTRIC X-RAY CORPORATION
TORONTO: 30 Bloor St., W. • VANCOUVER: Motor Trans. Bldg., 570 Dunsmuir St.
MONTREAL: 600 Medical Arts Building • WINNIPEG: Medical Arts Building



When writing Advertisers kindly mention this Journal.

The Focal Spot

Journal of the Canadian Society of Radiological Technicians

Volume 3 *JULY, 1946* *Number 3*

CONTENTS

The Relation of X-Ray to Urology 119
L. I. Mitchell, M.D., Calgary.

The Healing—and Lethal Rays 125
H. Lacharite, M.D., Montreal.

Inter-relationships 132
Herbert R. Corbett, M.D., Halifax, N.S.

Non-Visualized Cholecystograms 135
Marie G. Perron, R.T., Saskatoon.

Elementary X-Ray Physics (Part 3) 137
K. E. Hall, Toronto.

Travelling Chest Clinics 147
N. Nelson, R.T., Calgary.

Corporations 149
P. E. Hunt, R.T., Saskatoon.

Editorial 153

C.S.R.T. News 155

Niagara 156

Agenda for 1946 Annual Business Meeting 124

C.S.R.T. Curriculum 158

C.S.R.T. Membership Certificates 158

Ontario Exam. Results 134

Provincial News:

Alberta 110

British Columbia 110

New Brunswick 112

Manitoba 160

Nova Scotia (6th Annual Meeting) 160

Ontario 162

Quebec (5th Annual Meeting) 163

Saskatchewan 164

Technicians Available 164

List of Officers ..... 114 and 116

EDITOR
LESLIE J. CARTWRIGHT
Hospital for Sick Children, Toronto

ADVISORY BOARD
DR. W. K. COLBECK, Colbeck Clinic, Welland
DR. L. R. HESS, Medical Arts Bldg., Hamilton

BUSINESS MANAGER
W. H. OSBORNE, Toronto General Hospital

CIRCULATION MANAGER
HUGH J. MENAGH, 67 College St., Toronto

SUB-EDITORS

Alberta
MISS F. DYLKE
601 McLeod Bldg., Edmonton

British Columbia
MISS M. PATERSON
Royal Jubilee Hospital, Victoria

Manitoba
M. STESKI
Winnipeg Clinic, Winnipeg

New Brunswick
RUSSELL MORSE
St. John Tuberculosis Hospital

(Northern Section)
MISS MARY HOWES
Miramichi Hospital, Newcastle

Nova Scotia (Central)
A. PERRY
Camp Hill Hospital, Halifax

Nova Scotia (Cape Breton)
MISS CLAIRE MacGRATTON
St. Joseph's Hospital, Glace Bay, C.B.

Ontario
R. G. WILLIAMS
General Hospital, Belleville

Province of Quebec (English)
MISS ROSEMARY O'HAGAN
Montreal Gen. Hosp. (Central Div.)

Province of Quebec (French)
SOEUR MARGUERITE de JESUS
Hôpital Notre-Dame de l'Espérance
St. Laurent, P.Q.

Saskatchewan
S. G. JOHNSTON
General Hospital, Moose Jaw

Newfoundland Correspondent
CLARENCE ROBERTS
Grace Hospital, St. John's

British West Indies Correspondent
G. A. B. FULLERTON
Public Hospital, Kingston, Jamaica

The Focal Spot is owned and published by the Canadian Society of Radiological Technicians. All possible care is taken to publish only acceptable and accurate information, but no responsibility is accepted for the views or statements in published communications.

Material for publication may be sent direct to the Editor or submitted through the Provincial Sub-Editors. Manuscript should be typewritten, double-spaced with wide margins and it is strongly recommended that a carbon copy be retained by the author. The author's name and address should appear on the manuscript. Manuscript will not be returned unless specifically requested.

All correspondence regarding individual subscriptions, change of address or non-receipt of the Journal should be addressed to Hugh J. Menagh, 67 College Street, Toronto, Ont.

ADVERTISEMENTS—Cuts, Layouts and Advertising Copy should be sent to Wm. H. Osborne, Dunlap Building, Toronto General Hospital. Advertising rates on request.

Contents may be reproduced only when credited to The Focal Spot and author.

Annual Subscription, $1.50. Published Quarterly.

Perfect balance

IT would be difficult to over-emphasize the importance of balance in an x-ray film. For a good x-ray film—one like Ansco High-Speed—must have a proper balance of several important film qualities.

The film you use must be capable of producing desirable contrast while at the same time rendering detail over the widest possible range of bone and tissue thickness. Furthermore, it must have high speed to minimize the possibility of subject movement during exposure.

Ansco High-Speed X-Ray Film is perfectly balanced in speed and contrast to produce clear, sharp, radiographs of high diagnostic value.

Specify-Ansco in your next order.

ANSCO OF CANADA LIMITED
60 Front St. West
TORONTO 1, ONTARIO

Ansco
HIGH SPEED
X-RAY FILM

When writing Advertisers kindly mention this Journal.

DIKOL TABLETS

For Oral Cholecystography

Dikol tablets are not a phenolphthalein derivative, are well tolerated and non-irritating. Paregoric or other forms of sedation unnecessary.

Dikol tablets are easily administered with a minimum of instruction and inconvenience to the patient.

Dikol tablets come individually wrapped in cellophane in boxes of 100 or 250 tablets. One tablet is recommended to 25 pounds patient weight.

Envelopes are supplied with printed instructions on the front, facilitating dispensing to patient.

HYDRO APPROVED CANADIAN MADE EQUIPMENT

FERRANTI ELECTRIC LIMITED

X-RAY DIVISION TORONTO, ONTARIO

MONTREAL TORONTO LONDON WINNIPEG EDMONTON VANCOUVER

The Focal Spot

Journal of the Canadian Society of Radiological Technicians

Volume 3 *JULY, 1946* *Number 3*

The Relation of X-Ray to Urology*

By L. I. MITCHELL, M.D.
Calgary, Alta.

WHEN first asked, about three weeks ago, to speak to you on some topics of mutual interest to X-ray Technicians and Urologists, my first reaction was that all I knew of the topic was that we found x-ray very useful at times in Urology, but other than that I knew very little about it. However, as the time went by, I began to realize more and more that I would have to say more than just that; I began to think and look at a few books, and by the time I had prepared this paper I was wondering if we ever did anything without the assistance of the X-ray Department. Furthermore, I have found, in the last few days, that it is very difficult to cover the whole topic adequately in a tolerable amount of time. This will introduce the subject, and stimulate further reading to clarify what should be between the lines.

In 1896 a Glasgow surgeon detected a renal calculus by x-ray, and removed it. In 1897 an opaque ureteral catheter was first used for diagnostic purposes. In 1901 two other surgeons independently used an opaque catheter containing a fused wire inside for x-ray diagnosis. In 1904 emulsion of bismuth was injected into the pelvis and ureter — this failed because the bismuth did not give a clear picture, and was eliminated poorly. In 1906 two German doctors used 5% colloidal silver successfully to outline the renal pelvis and ureter. In 1913 20% xeroform in olive oil was used. In 1915 thorium nitrate and sodium citrate were used, which was very successful, and has been used in many places since. In 1918 Cameron introduced 12% sodium iodide. This has recently been shown to be less safe than was formerly thought, but is still used in many places. The use of oxygen and air in the renal pelvis were difficult to assess due to confusion with gas in the bowel overlying, and the danger of air embolism. Lipiodol has been used for bladder and urethra x-rays.

There are three ways of investigating the urinary tract by means of x-ray. They are:—

1. Ordinary x-ray examination, flat film and stereoscopic.
2. Intravenous urography.
3. Retrograde urography.

The success of any of these methods depends upon adequate preparation of the patient, which consists essentially in the elimination of gas and solid material from the gastro-intestinal tract. No definite routine will consistently achieve this end satisfactorily. It is essential that the patient refrain from eating and drinking for at least six hours prior to the examination. Our practice here has been to give castor

* Read at meeting of the Calgary Branch of the Alberta Society of Radiological Technicians, October, 1945.

oil at 4 p.m. the day preceding examination. Some radiologists advocate enemeta the night preceding, and the restriction of food and water for 12 hours. Occasionally very satisfactory films can be obtained with no preparation, but these two are not dependable consistently. If considerable gas is found after taking the scout film, petressin can be given in an attempt to eliminate it. All these measures at times are ineffectual, and examination at another time may be the only solution; however, retrograde pyelography is much more informative as a rule in the presence of gas than is intravenous. The use of the Potter-Bucky diaphragm is almost essential, and the shorter exposures decrease the likelihood of respiratory motion, especially in uncooperative patients.

The film commonly asked for (that is, K.U.B. plate), to be considered satisfactory, should include, at its lower margin, the symphisis pubis completely, and at its upper margin the lower two ribs. This is best achieved by placing the crest of the ilium opposite the middle of a 14 x 17 plate.

Intravenous Urography:

This was first used by Swick in 1929 when iopax (uroselectan) was discovered, and has been universally used all over the world since then. Besides iopax other preparations are used, including uroselectan B (neoiopax), skiodan (abrodil), neoskiodan (diodrast) and lastly zippuran.

Intravenous urograms should be used:

1. Where owing to anatomic, pathologic or technical reasons it is impossible to perform cystoscopy or instrumental pyelography.
2. In cases of ureteral obstruction where the pyelographic solution cannot be injected beyond the obstruction.
3. Where instrumental pyelography is risky for the patient.
4. When symptoms pointing to the urinary tract are minimal but nevertheless sufficient to justify an investigation of its anatomical status. More specifically, these would include children, cases where mechanical or infectious factors affecting the lower urinary tract prohibit instrumentation as in lower tract obstruction and as in cases of implanted ureters. It is not in any way a substitute for retrograde pyelography.

Retrograde pyelography:

Cystoscopic examinations performed by a more conscientious urologist are done with the patient anaesthetized; local or spinal anaesthetic being preferable. At this time complete examination of the lower urinary tract (i.e., urethra, prostatic urethra, trigone, bladder, and ureteral orifices) is made. Small ureteral catheters are passed to one or both renal pelves. Information regarding the patency of the ureter, and the amount of urine contained within the renal pelves, as well as its microscopic appearance, is determined. Any of the substances employed in intravenous urography may be injected through these catheters, and x-rays taken. Scout film with catheters in ureters should always be taken before injecting dye, and if calculi are suspected, oblique or stereoscopic film should be taken. These should be ex-

amined before the dye is injected. If mobility of a kidney is suspected, both reclining and upright films should be taken, or in some cases it may be advisable to do a double exposure film on inspiration and expiration. A film taken following removal of the ureteral catheters, with patient upright, will demonstrate the physiology (i.e., the emptying time). Normally the pelvis should be completely empty in five minutes. Any dye remaining after ten minutes is an indication of impaired drainage, probably due to some mechanical obstruction.

Let us review, rather briefly, the anatomy of the urinary tract, consisting primarily, as you know, of two kidneys, two ureters, a bladder and urethra. The upper pole of the kidney is usually found at the level of the 11th or 12th thoracic vertebra, and lower pole at the 2nd or 3rd lumbar. The right kidney is generally lower than the left, and in a female the kidneys are apt to be somewhat lower. It is well to keep in mind that the farther the kidneys are from the film the greater their magnification. The kidneys are bean-shaped, with their blood supply and urine drainage mechanism arising from the concave side. The pelvis of the kidney is funnel-shaped, and consists of two or three branches called major calyces — each minor calyx surrounds the cone-shaped bulge of kidney tissue called a pyramid, and it is from these pyramids that all the tiny collecting tubules of the kidney empty the urine brought down from the outside part of the kidney where it is manufactured. The lower end of the pelvis joins the upper end of the ureter, which is a narrow tube, averaging 5 mm. in diameter. These run almost parallel with the sides of the vertebral column, then pass posterior to the bladder to enter it at the upper corners of the tigone — about ¾" inside the bladder outlet. The ureter has four areas of constriction which are considerably narrower — these are at the junction of the ureter and pelvis — the junction of the ureter and bladder — at the middle of its abdominal portion, and where it crosses the bony pelvis brim. These are the spots at which calculi are most commonly found. There are many normal variations in the development of the ureter, pelvis, calyces and kidneys, and it would take an entire evening to discuss all these variations and their development, but to mention only a few, there may be first of all:

Complete absence of one kidney, complete absence of a definite pelvis with only a division of the ureter to form two or more calyces. These may join high up or at varying levels before entering the bladder, or may be completely separated throughout their entire course.

Classification of the variation in development of kidneys might be given, as follows:—

1. Anomalies of number—
   (a) Solitary kidney.
   (b) Super-numerary kidney.
2. Anomalies of volume—
   (a) Hypoplasia.
   (b) Supplementary lobe or hypertrophy.
3. Anomalies of form—
   Short, long or lobulated kidneys.
4. Anomalies of location—

(a) Simple or ordinary unilateral ectopia.
(b) Simple or ordinary bilateral ectopia.
(c) Crossed ectopia, with or without fusion of the two halves.

5. Media fusion, including "L" shaped kidney, caked kidney and sigmoid kidney.
6. Anomalies of rotation—
   (a) Faulty.
   (b) Excessive rotation.
7. Reduplication of pelves and ureters —double kidneys.
8. Anomalies of pelves other than reduplication.
9. Anomalies of vessels—
   (a) Of arteries.
   (b) Of veins.
10. Non-classification anomalies.
11. Accompanying or concomitant anomalies.

Anomalies of the ureter may be classified as (a) Anomalies of caliber and form, including:—

1. Congenital stricture.
2. Congenital valves or folds.
3. Congenital dilatation without demonstrable obstruction.
5. Spiral twists (tortion).
6. Kinks.
7. Post-caval ureters.

(b) Anomalies of origin and termination:

1. Anomalies of origin.
2. Blind ending ureters.
3. Ectopic ending.
4. Ureterocyle.

(c) Anomalies in number:

1. Absence.
2. Hypoplasia.
3. Double or triple ureters.

Classification of the anomalies of the bladder are:—

1. Absence—rare, but does happen.
2. Double: (a) The division is vertical from front to back. (b) System is vertical but transverse.
3. Patent urachus extends from apex of bladder to umbilicus.
4. Diverticuli.
5. Extrophy — due to defect in anterior abdominal wall in region of symphisis with separation of pubic bones. May be:
   (a) Defect of bladder at lower part — pubis being ununited.
   (b) Defect of upper part with the symphisis fused.
   (c) Extrophy of entire bladder.

Anomalies of urethra:

1. Absence.
2. Duplication.
3. Excessory urethral canals.
4. Obstruction due to congenital urethral valves, congenital urethral stricture, prostrate cyst, or diverticulum of the prostatic urethra.

Passage of urine from the minor calyces of the kidney through the major calyces, pelvis and ureter is carried out by regular peristaltic waves similar to those passing along the intestine. These waves may show temporary areas of constriction in one intravenous film, which do not show in succeeding films. Any interference of normal passage of urine along this route results in stasis, and is a potential source of infection, which may give rise to

dilatation of the ureter, causing a hydroureter; and if infected, a pyoureter; a dilatation of the pelvis (a hydronephrosis; or a dilatation of major or minor calyces called caliectasis. These dilatations and infections may occur on one or both sides. Stasis and infections may be the cause of calculus formation. Approximately 95% of renal calculi can be shown by x-ray, either by a flat plate or by intravenous urogram, showing obstruction, or in the case of non-opaque calculi, by the negative outlining of the calculus with dye surrounding it.

The ability to demonstrate urinary calculi depends upon:—

1. Density of the calculus.
2. Size.
3. Location.

In order of density calculi are seen best, as follows:—

1. Calcium phosphate.
2. Calcium carbonate.
3. Calcium oxylate.
4. Magnesium ammonium phosphate.
5. Cystine stones.
6. Urates stones.
7. Xanthine.

The latter two will probably only show in a negative way — that is outlined by intravenous or retrograde dye — or by obstruction to urinary passage.

Infection of the renal pelvis which persists for any length of time results in formation of scar tissue, and this can often be seen as a change in the configuration of the pyelogram.

Hydronephrosis is diagnosed best in x-ray by the increase in the size of the renal pelvis above normal. If this is due to a definite mechanical obstruction, the obstructing object may be visualized in x-ray film.

Pyonephrosis may resemble hydronephrosis in x-ray film, but the finding of pus obtained from pelvis of the kidney, together with destruction of more kidney tissue than in hydronephrosis, makes the differentiation easy.

Tuberculosis of urinary tract is diagnosed on the finding of tubercle bacilli in the urine. These have to be found in the urine taken from the pelvis of the kidney, and are always found in association with pus cells (i.e., W.B.C.'s). Early renal tuberculosis shows a moth-eaten appearance adjacent to one or more calyces — more advanced tuberculosis shows more extensive areas of errosion or cavities adjacent to calyces. These earlier cases are best seen by the use of retrograde pyelograms. More advanced renal tuberculosis may show evidence of ureteral obstruction with pyonephrosis and thickened dilated ureters. They may even show calculi in the pelvis or ureters.

Early bladder tuberculosis shows no radiological pathology, but late tuberculosis may show contraction of the bladder wall on the side adjacent to ureter from the infected kidney.

Tumors of the kidney may be shown radiologically either by the enlargement of the kidney substance in the outside kidney shadow, or by their pressure on the renal pelvis. Usually they show a filling defect in renal pelvis.

Tumors of the renal pelvis and ureters are seen as filling defects, but may be confused with calculi, blood clots, etc.

Injuries:

The x-ray findings of kidney injuries are variable depending on extent and site of injury. Radiologist is chiefly concerned with after effects of these injuries. There may be bleeding inside pelvis with obstruction of calyx or ureter with secondary hydronephrosis. Hydronephrosis may occur sometime after injury as result of scar formation, causing obstruction of ureter or pelvis.

Polycystic kidneys show considerable increase in size of kidney, with very long, narrow calyces, quite unlike any other kidney pathology with the exception of some kidney tumors.

Perinephric abscesses may be shown by:—

1. Displacement of kidney or evidence of pressure with flattening of one pole.
2. Obliteration of the shadow of the psoas muscle, and, most important—
3. Fixation of kidney movement on that side, as demonstrated by double exposure films taken on inspiration and expiration.

Cystograms are useful in determining:—

1. Size of bladder.
2. Presence of calculi.
3. Presence of diaverticuli.
4. Presence of prostatic hypertrophy.
5. Trabeculation.
6. Extravesical pressure.
7. Ruptured bladder.
8. Foreign bodies in bladder.

This is by no means a complete survey of the uses of x-ray in Urology, but it is at least an attempt to cover a very large subject in a short space of time.

Agenda

PROBABLE AGENDA FOR THE ANNUAL GENERAL MEETING, 1946, CANADIAN SOCIETY OF RADIOLOGICAL TECHNICIANS!

Evening of September 25:

Meeting of Board of Directors, Associate Directors, and Official Delegates.

First Session (half day):

Registration.
Official Opening.
Roll Call of Delegates
Minutes of previous meeting (already printed)
Secretary-Treasurer's Report.
Appointment of Scrutineers.
Report of Board of Directors of Focal Spot.
Report of Board of Examiners.

Second Session (half day):

Brief Resume of First Session.
Report of Resolutions Committee.
Report of Committee on Delegates' Expenses.
Report of Committee on Diplomas.
Historian's Report.
Report of Scrutineers.
Other Committee Reports.

Third Session (half day):

Brief Resume of Previous Sessions.
Debate on Resolutions.
Business arising from Secretary-Treasurer's Report.
Business arising from Focal Spot Report.
Business arising from Report of Board of Examiners.
Business arising from Report of Committee on Delegates' Expenses.
Business arising from Report of Committee on Diplomas.

Fourth Session (half day):

Brief Resume of Previous Sessions.
Unfinished Business.
New Business.
Date and Place of Next Annual Meeting.
Adjournment.

The Healing—and Lethal Rays*

By H. LACHARITE, M.D.

Saint Jeanne d'Arc Hospital, Montreal, Que.

(Translated from the French by Mary F. Cameron)

ON the eighth of November, 1895, exactly half a century ago, a Bavarian physicist, as a result of experiments carried out in a rudimentary laboratory which he had set up for himself at Wurtzburg, gave to science one of the most marvellous discoveries of modern times, the x ray.

As his predecessors had done, William Conrad Roentgen had observed the luminescence of certain gases when an electric current was passed through them in evacuated tubes. He had observed the richness and variety of colours engendered in nitrogen and had seen them, as well as the tints peculiar to hydrogen and oxygen, change according to the degree of atmospheric rarefaction. On that momentous day Roentgen deliberately covered his Crookes tube with an opaque mask of black cardboard and made the room dark before warming up the tube by means of a Ruhmkoroff coil. On a nearby bench was a piece of paper coated with barium platino-cyanide. The vacuum tube, energized by an induction coil, was concealed under the black cardboard. What phenomenon was this experiment going to reveal? As the current passed through the tube, Roentgen perceived through the darkness a mysterious greenish light glowing on the sheet of paper. The platinocyanide of barium had become luminescent under the action of an invisible irradiation. Every other source of light having been eliminated, the rays must necessarily come from the Crookes tube. What was this unknown factor? Roentgen did not know, and that is why, according to custom, he called it "x". It has kept this name. At that historic moment the light from the fluorescent paper forged a new instrument of penetration for humanity. Its rays had gone through the glass walls of the Crookes tube and the cardboard envelope which covered it. The principle was established. The emission of x-rays would make it possible to penetrate anything.

During the 50 years which followed the discovery of x-rays, radiography has been developed in an amazing manner. It has proved itself an invaluable help to medicine in the diagnosis and treatment of disease. However, the x-ray is no longer the exclusive prerogative of medicine. It is now called upon to reveal many other things besides fractures, pulmonary and stomach lesions, and the safety-pin that the baby has just swallowed. Industry, and especially heavy industry, uses it all the time. The little tube and coil

* Translation of a paper given by Dr. H. Lacharite before the Quebec Society of X-Ray Technicians.

of Roentgen have become metamorphosed into highly mechanized tubes with rotating anodes, and into massive machines with a discharge sometimes exceeding a million volts. What progress from the old glass plate up to the most recent type of radiographic film! The x-rays have not finished their revelations, their field of exploration being, in very truth, unlimited.

To understand the origin of another marvellous discovery we must go back to the year 1896, one year later Roentgen's discovery had thrown into confusion a whole chapter of physics and aroused among the scholars of the whole world a keen rivalry to explain the nature of these rays which they were just beginning to know as a fact, without being able to elucidate their origin. The illustrious mathematician Poincaré, cousin of President Poincaré, had wondered whether it might be the fluorescence of the tube by the cathode rays coming in contact with its wall (for at that time the metallic anticathode did not exist) which caused the x-rays. According to this ingenious but false hypothesis, a sufficiently fluorescent substance would emit x-rays every time it was illuminated.

Becquerel then had the idea of illuminating by means of the sun fluorescent crystals of uranium placed on a photographic plate wrapped in black paper, thinking that under this action, according to Poincaré hypothesis, crystals of sulphate of uranium would emit x-rays and that, from this, their image would appear on the plate after the development. This happened, but in reality not for the reasons supposed. In fact, a repetition of the experiment having been prepared (with a few modifications which I will pass over) but the sun not having appeared, the whole thing was left at the bottom of a dark drawer. After several days of waiting, Becquerel wished to check the plate as a control before exposing a fresh plate to the clear sunlight. To his great astonishment the plate, left in the dark in a drawer and covered with crystals of sulphate of uranium, had an impression on it. The uranium crystals would themselves, then, emit rays susceptible of making an impression on photographic plates and as Becquerel proved, of discharging electrified bodies; they were, using the word Mme. Curie afterwards employed, radio-active. This important discovery of Becquerel is written up in the report of the Academy of Sciences of March 1, 1896, and inaugurates the era of radio-activity.

It was then that Mme. Curie set to work at the School of Physics and Chemistry to verify whether radio-activity was peculiar to uranium or could be found in other substances. She then tried to determine what might be the radio-activity of a whole series of substances. She did it by means of the ionization method which consists of measuring a current of weak intensity going through the air, which is made a conductor, ionized by the rays emanating from the radio-active body. This mensuration was possible, thanks to the extraordinary sensitiveness of Pierre Curie's admirable piezo-electric quartz. This method, called by Mme. Curie herself the "Chemistry of the invisible" can measure a billionth of a cubic millimeter of radio emanation.

The precision of this method of measurement permitted Mme. Curie to

have absolute faith in her experiments in spite of apparently paradoxical results. The paradox was that certain fragments of impure mineral, such as pitchblende of Joachimsthal (oxide of uranium) showed themselves three times more radio-active; others, such as phosphate of copper and uranium, twice as radio-active as uranium itself. Mme. Curie did not hesitate to interpret these facts as proving the existence in the mineral, from faint traces, of an unknown body, excessively radio-active and different from uranium. Pierre Curie joined his efforts to those of his wife to search for this new body, the existence of which seemed to them scientifically proven.

This "march to the star" lasted for two years. Thousands and thousands of kilograms of mineral ore were seen going into the yard of the laboratory. Now at that time the radium found in a portion of ore was in the proportion of one gram for 400,000 tons of ore. But their faith in science was so great that they kept seeking, and found; so that, in 1898 there was presented to the Academy of Science: Radium. In fact, in December, 1898, M. and Mme. Curie, aided by M. C. Bemont, had clearly isolated a new chemical substance similar to barium but prodigiously radio-active and in which the eminent physician Demarcay recognized in the region of the ultra-violet a new spectroscopic ray until then unknown.

So radium had been discovered. A substance which sent out rays capable of going through opaque material, lead not stopping its rays unless the lead was 30 centimetres thick; these rays discharged electrified bodies, but we know to-day that these rays do something more: they cure cancer. But why do they cure, how do they cure, and how did the idea of applying them in therapeutics arise? It was because radium possesses the property of destroying living tissues. The first to whom this unsuspected power was accidentally revealed was Henri Becquerel. M. Becquerel, who was so to speak the godfather of radium, obtained from Mme. Curie a small tube of radium, this tube being simply of glass. He put it carefully into his pocket, showing it with joy to everyone he met. Now after a month he noticed on his breast a quite noticeable burn, which was slow in healing. This accidental observation was cerified by Pierre Curie. Deliberately, as a scientist solicitous about checking results, Pierre Curie wished to study the phenomenon on his own person; he took a similar glass tube with the same quantity of radium and kept it under his arm for ten hours. After a few days he saw appear at the spot where he had applied it, a painful ulcer which took no less than four months to heal. In the hope that this destructive force would become, when disciplined, a beneficent power, Pierre Curie and his wife entrusted a little of the precious substance to a doctor in the Hospital St. Louis, who cautiously applied it to destroy certain morbid skin affections. Other French doctors continued these first attempts at treatment, extending them to deeper lesions and improving the technique. Thus there arose in France in 1902 a new method of medical treatment, soon adopted and studied in all civilized countries, and which steadily increased in value.

The new method of treatment was at first called radiotherapy. Then, after other radio-active substances were discovered and several were also shown to have healing powers, it received the name of Curie-therapy, which is only just, as in Germany the name Roentgen-therapy was given to the treatments which use the x-rays discovered by the Physicist Roentgen.

As for this extraordinary substance called radium, a substance which constantly emits rays from itself; how does it emit them? It emits a real invisible light, as the sun emits visible light. But radium in emitting its rays destroys itself; it does not destroy itself quickly, for it loses only half of its power in 1700 years. To us, this period seems very long, but in the eyes of science it is a short time, since uranium, which also loses its power, loses only half of it at the end of 6 billion years. Let us now look a bit more closely at what are called radium rays. These rays, which the study of physicians has divided into three classes, the Alpha rays, the Beta rays, and the Gamma rays, named after the first three letters of the Greek alphabet, were thus named by Rutherford; they are not all directly emitted by radium. Only one part of the Alpha rays is found in this case. The others are emitted by the products of the disintegration of the radium, or more exactly by real transmutations with dislocation of their atoms; these phenomena are produced regularly, automatically, according to unchangeable laws, now well known, and which cannot be modified at all by the action of exterior forces. When radium in a sealed tube at the state of balance (we will see in a moment what this state, obtained about a month after the imprisonment of the radium in a tightly sealed tube, constitutes) emits Alpha, Beta and Gamma rays, a part of the rays, and all the Gamma rays in particular, come from the disintegration of the bodies themselves derived from the radium, namely, the "emanation of the radium" and of the bodies called radium, A, B, C, etc.

Let us see first what the Alpha, Beta and Gamma rays are; we shall then look at their origin. The Alpha rays are atoms of helium, charged positively and shot out at a speed of 20,000 kilometres per second but which cannot travel more than 7 centimetres and are stopped by the least obstacle. They cannot go through .06 mm. of aluminum and are stopped by the superficial layer of the skin; they are easily deviated by magnetic fields like positive bodies, that is to say in the opposite direction from the second class of radium rays, the Beta rays, which are negative corpuscles. The Alpha rays behave like the channel rays of the Crookes tube to which they are similar. They are not used much in therapeutics and only in the application of radioactive tinctures. They represent about 91% of the energy of radium.

The Beta rays are quite similar to the cathode rays of the Crookes tube and like them strongly deviated by the magnetic field like the negative corpuscles. They are particles of electricity charged negatively, projected with a speed close to that of light. They represent 3.2% of the total energy of radium.

The Gamma rays discovered by Villard represent 4.8 of the energy of radium. They are not, like the preced-

ing, corpuscular rays, but vibratory rays. They are not deviated by the magnetic field and are of an undulatory nature but of much shorter wavelengths than the hardest x-rays, even those emitted at 200 kilovolts. It is really the Gamma rays which are employed in therapeutics. In a few cases and when following a certain technique, Beta rays are also used.

Curie-therapy uses sometimes the general action of radio-active substances introduced by different means in a state of extreme dilution into the blood circulation, sometimes, and much more often, the local action exercised by the rays of those substances of which radium remains the most perfect type. This local action is beneficently used in a fairly large number of different maladies, the list of which is doubtless not yet completed. Among these maladies cancer, because of its seriousness, occupies the most attention and leaves all the others in the shade. How does the radium ray act on this scourge? To understand its mode of action on cancerous tumours is to understand also its efficacy in the treatment of other tumours and in other less serious maladies. X-rays and Gamma rays are of the same nature. Both possess the property of penetration and of destroying the living cells individually. The Gamma rays have, besides the advantage of being much more penetrating, the advantage of conforming much better to the differing requirements of treatment. The sun in miniature, which the smallest quantity of radium represents, can be enclosed in small tubes or in fine metal needles comparable to Lilliputian Roentgen tubes. These tubes can be distributed in varying numbers a short distance from the skin or inserted into natural cavities. These needles can be put into the thick part of infected tissues. They are tiny, but marvellously active and powerful fires from which spread in every direction the rays of an invisible fire.

In these tubes and in these needles there can also be put, instead of radium, only the gaseous substance or emanation which, by means of atomic disintegration evolves constantly to produce the ray. The radio-active heat formed by this emanation no longer represents an unchanging capital with a constant supply, but only the perishable supply of this capital, a supply, moreover, which is quite rapidly dissipated, since in less than four days, 3.85 days to be exact, it consistently loses half of its value. Its use none the less presents a certain advantage. The x-rays and Gamma rays are capable, in strong doses, of destroying en masse living tissues as a caustic would do, but in smaller doses it seems to make a choice; they seem to exercise what is called a selective action, since among the living cells of the irridiated territory they destroy some and leave the others intact. The truth is that they do not make any choice, but our different epidermic, muscular and nervous cells are sensitive in very different degrees to their destructive action. The reaction of these different cells to the same dosage of rays is as different as that of different substances, paper, cloth, wood and metals, in the flame of the same fire. The living cells which are the most sensitive to radium are as a general rule those in which the multiplication is the most rapid. Such is the habitual case with cancerous cells. Such

is consequently the principal reason for their greater radio-sensitiveness. It is thus that x-rays and Gamma rays represent so many surgeons' knives, or rather invisible arrows, marvellously subtle and sharp, capable of piercing the whole diseased part and without bloodshed or mutilation, through the intact skin, of killing the cancerous cells in an internal organ while letting the adjacent cells live. The chances of success of the treatment, the often almost insurmountable difficulties of its application, its undeniable dangers, depend essentially on the degree of difference between the radio-sensitiveness of the cancerous cells and that of the healthy cells. Now this difference, sometimes very great, is quite often very small and may even become none at all. This is, without speaking of other obstacles, the greatest stumbling-block in the way of treatment by penetrating rays.

Radium is not a talisman nor a panacea applicable to all cancers and capable of curing a cancer at any stage of its growth. It is only, in certain conditions, an excellent weapon and the field of its use is being extended as the very delicate technique of its use is being perfected. Moreover, cancer has as yet revealed only a part of its secrets, but we need no longer see in it a hereditary ill, the appearance and growth of which must of necessity be fatal and to which one must religiously or stoically resign oneself. It is at its beginning a local trouble — narrowly and exclusively local — arising at a point of abnormal, disordered, anarchical multiplication of a few microscopic cells under the influence of various causes, the experimental study of which is to-day being carried out successfully on animals in research laboratories. At this first stage of local trouble it is certain that cancer is curable, perfectly curable. The necessary and sufficient condition for its cure is the suppression or complete destruction of all the cancerous cells still assembled in their place of origin or already starting to scatter in the nearby tissues.

For a very long time only one weapon was known for cancer — the surgeon's knife. But also for a long time the knife has been giving way to x-rays and even more to radium in the treatment of superficial cancers, especially of the face and lips. In the last few years radium, thanks to a better technique, is being used with good results instead of the surgeon's knife in the treatment of deeper cancers, which become serious more rapidly and require a much more difficult treatment than superficial cancers. We see cancer of the tongue and mouth, of the throat, of the larynx, and, most deplorable of all cancer of the uterine canal which, when it strikes the mother of the family seems a cruel price to pay for maternity and for which one may feel inclined to rail at the injustice of fate, if one did not know that nature's inflexible laws know neither good nor evil. For cancers of this sort, in inoperable cases, one obtains from radium, skilfully used, not only remarkable improvement, the relief of pain and the prolonging of the life of the patients, but in a good proportion of cases, lasting cures. In operable cases, according to the most recent and conclusive observations, cures produced by radium are much in excess of those obtained with

the knife. Formerly the doctor confronted with a cancerous tumour had to ask himself only: is it or it is not operable? He must to-day ask himself more complex questions. Of the two weapons, the knife and radiation, which form the whole of our arsenal against cancer, which is preferable? Should one be employed or both? In this case, what is the best way of combining their use? A difficult problem, the solution of which will doubtless be different in a few years from what it is to-day and one which requires constant laboratory research.

There is an ever-increasing interest in this subject of radiation treatment and that is why I am happy to have been able to set before this audience of collaborators the problem of the struggle against cancer, thanks to your great patron saints, Roentgen and the Curies. I hope that all of you will go and spread the good news everywhere and thus help us in our efforts aimed at the extinction of this terrible scourge.

A word of advice to finish with. I know that you are all excellent technicians, radiographically, and that you even have something to teach most radiologists; however I strongly urge you to enlarge your field in order to collaborate as efficiently as possible with the radiotherapeutist in the administration of the Roentgen and Curietherapic treatments. I have pleasure in telling you in this connection that I am very well off indeed. Your colleague, who is to-day in charge, in my service, is a fine example of the finished and perfect technician and I take advantage of this occasion, which has given us the privilege of receiving you, to congratulate her on her recent successes. Her efficiency is equalled only by her untiring devotion. Her overflowing enthusiasm recently made her a victim of the rare "March" fracture as a true soldier of radiology. I refer to Sister Marie-Francoise of the x-rays, as she is called here.

My last word is an appeal to prudence. You know the danger of the rays. These same healing rays are also fatal, death-dealing rays. The list of victims is steadily growing longer. The Bergonies, Turchinis, Blanches, whom I had occasion to treat in Paris, and who died none the less from radiation cancer. More recently it was Parizeau in Montreal and Iser Salomon in Paris who were victims of cancer of the intestine, just like Roentgen. Is that coincidence, or the effect of the rays? And Mme. Curie, who died of radiation anaemia some forty years after its discovery. In her laboratory, where I had the privilege of working for more than three years, one could already suspect the first symptoms of this malady which does not forgive. She would not however admit the evidence. She answered the solicitude of her pupils only by redoubling her efforts. It was only when she felt her strength leaving her that she resigned herself to rest, but it was too late. Within these last few years, two technicians of the Institute of Radium of Montreal, both of the same family, brother and sister, were carried away by this same illness which is called roentgen anaemia. These facts should make you reflect and indicate prudence.

Inter - Relationships

By HERBERT R. CORBETT, M.D.
Halifax, N.S.

WHEN I took my post-graduate course in Radiology at the University Hospital, University of Michigan, under the tuition of the late Dr. Preston M. Hickey, of honored memory, regarded as the greatest authority in x-ray technique in North America, there were several pertinent matters relating to procedure he would stress, guiding points and wise counsel, that have stood by me and I would like to give you the benefit of some of these axioms now.

Under the first heading I wish to deal with the Relationship of the X-Ray Technician to the Patient.

A technician, like a nurse, should be endowed with more than the usual amount of patience and personality. Remember that we are dealing with sick patients, sick mentally as well as physically in a number of instances. Each patient receives an individual impression of the technician. Each patient considers her state of health and symptoms without regard to others of her type no matter whether the technician considers him or her as just another case of a "gall bladder," G.I. or chest. Patients like to receive individual attention no matter how busy or how worn out we are. We ourselves appreciate how patience can be exhausted, when our nerves are worn to a frazzle after a hard day's work — the patient does not appreciate those things, he or she is only thinking of herself, therefore we must try and deal with the individual in such a way that a satisfactory impression will be left of the technician and hospital. Special care re foreign patients, especially for G.I. study.

Selection of Patients in a Busy X-Ray Department:

This chiefly applies to departments which are not in a position to arrange appointments.

When you are confronted with a large number of patients in the waiting room and where you have more than one diagnostic machine and two or three technicians, if you want to speed up the work and have the minimum of waiting, why not group your cases? Take all the chest cases together, your machine is all set up, if you have the tank space and hangers you can easily run through 6-8 cases in 15 to 20 minutes.

The other machine can be set up for heavy work such as spine, skulls, etc., that take more time.

When there is a rush, the junior technician can do the simple work such as extremities, etc., with the portable apparatus.

It is all a matter of organization. When there is considerable work, one person should remain doing the dark room work. The practice of taking a chest case, developing the film, then

*Paper read at Annual Refresher Course of the Nova Scotia Society of Radiographers, May 15-17, 1946.

setting the machine up for another part of the body takes too much time.

Positioning the Patient:

There was one principle that Dr. Hickey would stress, that is "If you wish to have your patient properly immobilized, make him comfortable first. There is no sense piling up sandbags and other retentive apparatus around a limb, if that limb is in a cramped position; there is bound to be movement which will cause loss of detail.

In the case where it is difficult for the patient to remain quiet, due to pain from the injury, have everything ready first, then set him — that applies especially to chest cases who are brought in on stretchers.

Hold the patient in the department while you develop the films if you are not sure of your exposure factor — it is embarrassing to all for the patient to be asked to return. He invariably gets the idea "that the plate turned out bad"; explanations are in order and he is inclined to think that you are ineffecient.

The Relationship of the Technician to the Physician:

What I have to say concerning this matter applies in a sense to hospitals which have not a full-time radiologist — a condition that exists in many of our institutions throughout the Province.

It should be remembered that the x-ray department is dependent on the support of practitioners for referring of patients, therefore every consideration should be given them. On the other hand, there are certain conditions that govern the working schedule of the department and it requires constant vigilance to see that they are carried out.

There are always a certain few physicians who will not fill out x-ray requisition slips properly. It is often an error of omission rather than of commission. Slips come up "Please x-ray leg" or "Please x-ray Mrs. —— for Dr. ——." Unless the radiologist is available, the technician is duty bound to include the area from the hip joint to the ankle.

Pardon a divergence for a moment in order to emphasize a point that is sometimes overlooked. When an examination of the forearm or lower leg is requested it is a good policy to include both joints, A.P. and lateral exposures (two) can be made on an 11 x 14 or a 14 x 17, covering the other half with lead or lead rubber. A fracture of the ulna near the wrist is often accompanied by a dislocation of the head of the radius. Also in oblique fractures of the ankle joint the neck of the fibula is often broken. It is also important to know about the carrying-angle or weight-bearing line.

The Relationship of the Technician to the Radiologist:

In the early days of roentgenology, the specialty was relegated to the physicist and photographers — medical men would have nothing to do with what was termed "machine made diagnosis." Very soon it became evident that the knowledge of medicine and surgery was necessary if Radiology was to assume its proper role in scientific

medicine. As the field broadened out and new realms for investigation were opened up, the "x-ray expert", as he was sometimes termed, found it very necessary to have an assistant or assistants who would carry on the technical end.

Radiology is an accurate science. However its accuracy depends on (1) The basic medical knowledge and experience of the Radiologist; (2) His specialized knowledge of radiology; (3) His ability to correlate the above factors. The specialized knowledge of radiology depends on several inherent factors, above all the ability to get as much as possible out of a fluoroscopic examination or a set of radiographs — accurate information; remember a radiograph is a record of comparative densities. The information that the radiologist depends on is in the films and his subsequent opinion and eventually his reputation will depend on the quality of films taken.

X-ray interpretation is very difficult; don't make it any harder by turning out poor films. One of the first things an ex-ray technician should know is whether or not a film is satisfactory or unsatisfactory and if the latter, what technical errors made it so. Don't hesitate to take it over again; trying to save a few cents on films might cost the patient hundreds of dollars or involve the radiologist or doctor in a lawsuit. As I have stated before, it is embarrassing to have the patient return, therefore get it right the first time.

Acquire the sense of satisfaction in obtaining a good radiograph, do not work with faulty equipment if it can be helped; above all, eliminate screens that have poor contact. The trouble with us all to-day is that there is too much routine work, we are too rushed. There is not enough time to develop our artistic sense. In the old days deportment was an art, an x-ray department was known by the fine quality of films turned out. To-day with the improvements in equipment our work is becoming mechanical. We must guard against the pendulum swinging the other way — guard your craft zealously, co-operate with the radiologist with loyalty and devotion and you will courageously carry on and maintain your vocation to serve the interests of medical science.

Examination Results
Ontario Society of Radiographers

Just as we go to press comes the first of the Examination Results, this list being Ontario's candidates.

The following members of the Ontario Society of Radiographers were elected by examination April 27, 1946:

Beatrice E. Blair, R.N.; Marion Ballantyne, R.N.; Evalena Clarke, R.N.; Sister M. Eucharia, R.N.; Leslie T. Fox, R. Hart Griffin, Katherine Golden, R.N.; Sydney A. Grieef, Dorothy M. Hillis, R.N.; Phyllis M. Howell, R.N.; Loretta Hurley, Mary Jane Martin, Jean L. MacLean, R.N.; Vaughan P. Russell, Dorreanne L. Sanderson, R.N.; Muriel Simpson, R.N.; Anthony Stechyshyn, Barbara Taylor, R.N.; Donald S. Thorburn, Marion Uptegrove, R.N.; Janice E. Walter, B.A.; Peter Yemchuk.

Non-Visualized Cholecystograms

By MARIE G. PERRON, R.T.

Saskatoon, Sask.

MUCH has been written on cholecystography concerning the physiology of the gall-bladder and the technique to take well-visualized radiographs. We technicians take a particular pride in a perfect cholecystogram, but what is our reaction on scrutinizing a film when the expected shadow fails to show up? Non-visualized we say, and we cease to think of it as our responsibility. Do we ever stop to think of the number of these failures in the course of a year? Yet they are the ones that should worry us because the diagnoses of these cases are left to clinical signs only. The well visualized gall-bladder is a solved fact, but the non-visualized may lead to a false diagnostic interpretation, resulting in a needless operation, bringing on suffering that could be avoided and might even cause death.

A non-visualized cholecystogram does not necessarily indicate a pathological gall-bladder. Its failure to concentrate may be due to causes not in immediate relation to it. When the dye is taken orally it must first be absorbed by the stomach, then by the small intestine before passing through the liver and being eliminated in the bile and stored in the gall-bladder. This passage of the dye from the mouth to the gall-bladder may encounter delays or obstructions which would necessitate a larger dose of the dye and a longer period of time for absorption.

I have often observed the presence of dye in the small bowel on a non-visualized cholecystogram, and this was often associated with a seven hour stomach retention in the gastro-intestinal examination. This would mean that when the dye was taken, the slow action of the stomach did not release enough of the opaque substance to reach the gall-bladder. Failure to fill could also be caused by adhesions to a diseased neighboring viscus which causes some interference with the absorbing mechanism of the gall-bladder.

A great number of these cases previously left to clinical interpretation can now be visualized satisfactorily. The double dye dose proved a great help in our x-ray department in the last two years.

The great improvement in the quality of the dye substance has enabled us to make use of concentrated doses without hesitation. The present available form is easy to absorb and produces the minimum amount of nausea and vomiting.

Each case was first given a single dose of Cholepulvis, although Priodax was also given occasionally to the sickly and the fussy patients. Then, if the gall-bladder failed to visualize, a

double dose of Cholepulvis was given with the following specially typed instructions:—

At 12 noon take a fat free dinner.

At 2 p.m. take the first bottle of Cholepulvis, prepared as follows:

Empty the entire contents of the bottle of Cholepulvis in a glass; add a few drops of water to make a paste and work briskly. Then add enough water to make half a glass of solution. Stir well until the solution turns white.

Drink entire mixture at once.

After the medicine no food must be taken until six o'clock.

Water is not restricted at any time.

At 6 o'clock take your evening meal, consisting of dry toast or crackers without butter; any fruit juice, tea or coffee with sugar, but without milk or cream.

At 8 o'clock take the second bottle of Cholepulvis prepared as previously.

No food after evening dose but drink all the water you like. ..... morning come to this office at .....a.m. Do not take any breakfast, but drink some water if desired.

The following morning x-rays are taken in the usual routine.

To prove the success of the double dye cholecystogram, two hundred cases were studied with surprising results. The following table shows the detailed study of the research work:

200 cases single dose:	163 visualized:	148 well concentrated.		
		15 fair and diagnostic.		
	37 non visualizd	11 well visualized stones.		
		22 repeated, double doses.	16 well visualized.	
			6 non-visualized.	
		4 not repeated.		

Of the six non-visualized cases all were clinically diagnosed as cholecystic disease. Three were operated on; stones were found with adhesions around the cystic duct in all three.

The importance of double dye cholecystograms cannot be emphasized enough, in view of the fact that the gall-bladder visualization of many difficult cases is made possible, and by it provides a greater accuracy in diagnoses.

Summary:

In view of the large percentage of gall-bladders non-visualized with single dose and later visualized with double doses, it seems a good procedure to use double doses in all such cases.

Elementary X-Ray Physics

PART 3

TYPES OF RECTIFICATION

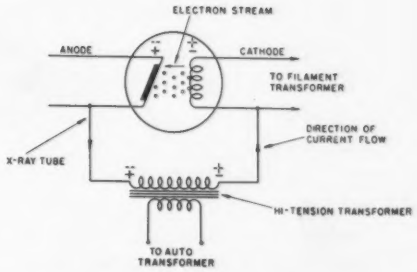
By K. E. HALL, Toronto*

Self Rectification:

As outlined in previous chapters, x-rays are produced by the bombardment of a metal with electrons. The bombardment is brought about by placing a positive charge on the anode, which attracts the electrons given off by the filament or cathode. It will be noted that in previous diagrams, batteries (direct current) have been shown supplying the positive charge to the anode. What would happen if the negative pole of the battery were attached to the anode? It means the anode would become negative with the result the electrons which always bear a negative charge would be repelled (like charges repel and unlike attract) and no x-rays would be produced. It is seen therefore that the anode must always be positive to allow for the production of x-rays.

Now suppose an alternating current be impressed across the x-ray tube, Figure 18a†. On the positive half of the cycle, electrons would be attracted to the anode because it is positively charged and x-rays would be produced. What happens on the negative half of the cycle? On this half of the cycle, it means that the anode would become negative and the electrons would be repelled, hence no x-rays would be produced. On the next cycle, the anode would become positive again and x-rays would then be produced.

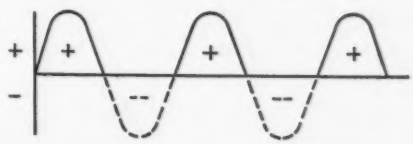
From the above, when employing A.C., we see then that x-rays are produced only on the positive half of the cycle and that the negative half is suppressed. In other words, the tube acts as its own rectifier. This is known as self-rectification and the current flowing through the x-ray tube is called pulsating direct current (Figure 18b.). Note that owing to the pulsating characteristics of this direct current the x-rays produced are not continuous but are emitted from the tube in a series of



X-rays are produced by the tube during the positive half of the cycle only: that is, when the anode is positive. During the negative half of the cycle the anode becomes negative and the electrons are repelled; current flow ceases and no x-rays are produced.

Fig. 18A. Self Rectification.

Fig. 18B. Self Rectification.
The positive half of the cycle represents the current flowing through the x-ray tube and is called pulsating direct current.



The negative half of the cycle is suppressed by the x-ray tube.

* Technical Service Dept. Victor X-ray Corporation of Canada.

† For simplicity, in the above circuit diagram, the auxillary equipment, such as meters, timers, circuit breakers, etc., have been omitted. In the final diagrams all auxillary equipment will be shown in their proper relationships. Note that in the above the schematic diagram of a transformer is given and will be used in all succeeding circuit diagrams.

impulses, the number of impulses per second depending upon the frequency of the A.C. employed.

This circuit is used in portable and mobile units and in smaller diagnostic units limited to 100 ma. capacity.

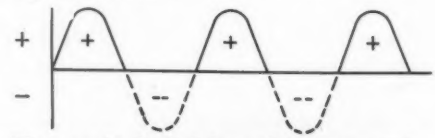
The Kenotron:

In self-rectified circuits, the tube supresses the voltage on the negative half of the cycle. This inverse voltage as it is sometimes called, may reach very high values as compared to the positive half of the cycle, and places a considerable stress on the x-ray tube. In order to reduce this voltage stress, what is known as a Kenotron is sometimes placed in series with the tube (Figure 19a and 19b).

A Kenotron is very similar to an x-ray tube inasmuch as it has a heated filament which is the source of electrons, and a collecting plate or anode. However, an x-ray tube is designed to produce x-rays while a Kenotron may be employed to reduce the inverse voltage placed across the tube during the negative half of the cycle, or by the use of four Kenotrons, change alternating current into pulsating direct current (full-wave rectification).

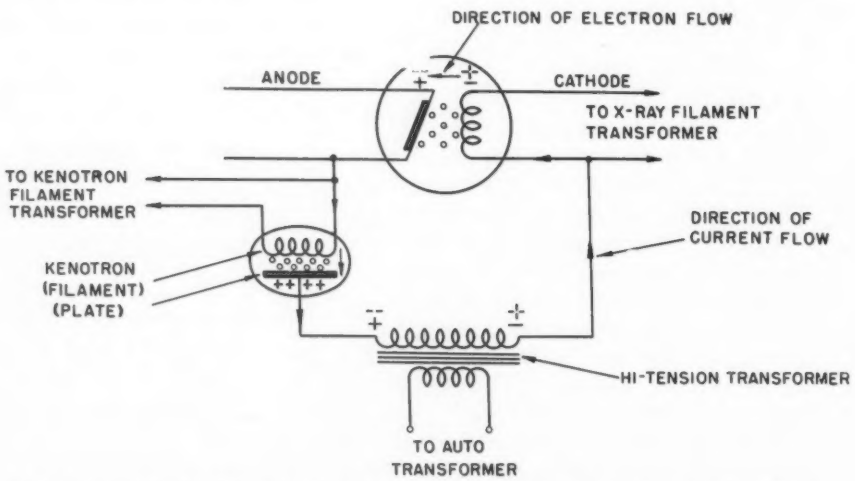
In reducing the inverse voltage placed across the tube, the Kenotron also acts as a valve, allowing the current to flow in one direction only. This direction is from filament to plate and only when the plate is positive. If the plate becomes negative, that is on the negative half of the A.C. cycle, the electrons are repulsed and no current flows. This is the valve principle utilized on full-wave rectified equipment.

The positive half of the cycle is called pulsating direct current.



The negative half of the cycle is suppressed by the x-ray tube and the kenotron.

Fig. 19B. Half Wave Rectification.



The kenotron acts as a valve allowing current to flow in one direction only. When the plate is positive current flows from filament to plate; when the plate is negative current flow ceases.

Fig. 19A. Half Wave Rectification.

Half-wave Rectification:

Sometimes two Kenotrons are employed — one placed on either side of the high tension transformer. When one or two Kenotrons are employed, the circuit is known as half-wave rectification. (Figure 20.)

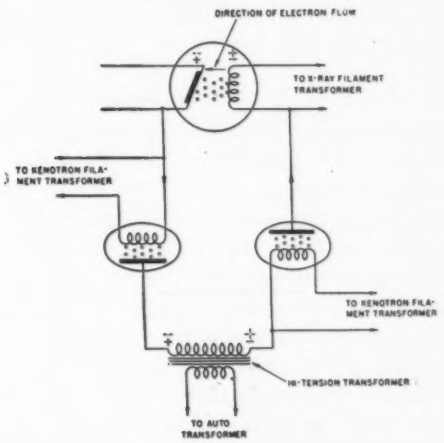
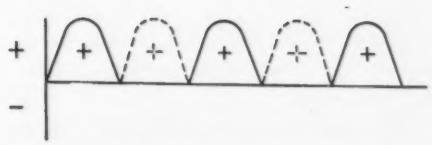


Fig. 20. Half Wave Rectification. (Employing Two Kenotrons.)

The use of two Kenotrons is generally used in superficial therapy units with shockproof cables where the kilovoltage values are somewhat higher than with conventional radiographic equipment. Not only do the Kenetrons protect the x-ray tube but also the shockproof cables.

Full-wave Rectification:

It will be apparent from the section on self and half-wave rectification, that although alternating current is a very convenient type of current for obtaining high voltages from low voltages (the transformer) it is not a convenient type of current when applied to the x-ray tube, due to the fact that part of the alternating current cycle (the negative half of the cycle) is not gainfully employed but is suppressed. In order to increase the efficiency of the x-ray



By means of the kenotron circuit the negative half of the cycle is made positive with respect to the anode.
Fig. 21C. Circuit for Full Wave Rectification employing Kenotrons.

tube, this negative half of the cycle is inverted, graphically speaking, or in other words, it is made positive with respect to the anode of the x-ray tube. It is represented graphically in figure 21c and is also called pulsating direct current. This procedure is called full-wave rectification and is accomplished by means of a rectifier. These rectifiers may be either one of two types, mechanical or Kenotron rectification.

Mechanical Rectification:

As mentioned previously, for operation of the x-ray tube, the anode must be positive, or stated in another way, the current supplied to the x-ray tube must flow from filament to anode. It can be intermittent or pulsating, but its direction must always be the same, that is from filament to anode.

The mechanical rectifier is simply a switching device to accomplish this effect; in other words, it is a device for changing alternating current into pulsating direct current.

Although mechanical rectification is still in use, it has practically been superseded by Kenotron rectification. Cross-arm mechanical rectification was invented by Dr. Snook, from whence the name Snook X-Ray Unit is derived. Mechanical rectification may also be accomplished by means of a disc in exactly the same manner as cross-arm rectification.

Polarity Indicator:

As mentioned before, not only must the current through the x-ray tube be

in one direction only, but it must be in the correct direction, that is from filament to anode.

With mechanical rectification, it is not always possible on closing the main x-ray switch to have the current flowing through the x-ray tube in the proper direction, for the operator has no control over the polarity of the A.C. wave and when the circuit is closed it may be closed at the instant the polarity is negative which means current would flow through the tube in the wrong direction.

In order to be sure the current is flowing through the tube in the proper direction, a polarity indicator is employed which is simply a direct current meter with a pointer which moves to the left for current in one direction, and to the right for current in the opposite direction. Should the meter read in the wrong direction, it only remains for the operator to open and close the switch until the meter does read correctly. Some of the units are also equipped with a reversing switch, which allows the operator to change the polarity without stopping and restarting the motor.

Kenotron Rectification:

In modern types of x-ray units, rectification is accomplished electrically by means of four Kenotrons arranged in what is called the Graetz Circuit.

Remembering that current flows through the x-ray tube and the Kenotron from filament to plate and only when the plate is positive, the circuit is given in figure 21a and 21b. Figure 21a represents the direction of current when one side of the transformer is

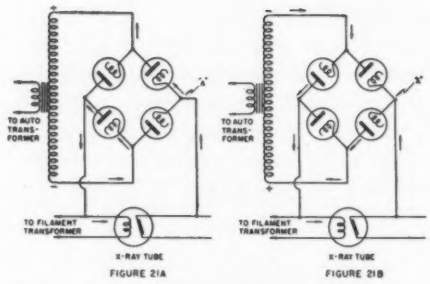


Fig. 21A. Circuit for Full Wave Rectification employing Kenotrons.
Fig. 21B. Circuit for Full Wave Rectification employing Kenotrons.

positive, as shown. Figure 21b represents the direction of current when the opposite side of the transformer is positive. It will be noted that the current has either one of two paths at "A" in both diagrams, that is from filament to plate. Why does not the current divide and flow along each circuit? On closer observation, it will be noted that at "A" one of the plates of the two Kenotrons in question is negative, so the current flows only through the Kenotron whose plate is positive.

Tube Rating Versus Type of Rectification:

If radiographs be taken with self-rectified and full-wave rectified equipment using the same kilovoltage, milliamper-second, and distance factors, it will be found they both have the same density. In other words, self-rectified and full-wave equipment both have the same radiographic speed. What is the advantage then, of full-wave equipment over self-rectified equipment?

Every rating chart supplied with the x-ray tube has three separate graphs, one marked "self-rectified equipment," another marked "half-wave equip-

ment," and the third marked "full-wave equipment."

It will be noted that for the same tube longer exposure times are permissible on full-wave rectified equipment. For example: With a tube operated at 60 K.V. and a current of 20 Ma., the maximum exposure time on full-wave-rectified equipment is 40 seconds; for half-wave, 15 seconds; and for self-rectified equipment, it is 2 seconds. This also may be expressed by stating that with full-wave equipment, higher milliamperages may be employed on the tube. For example, on a certain x-ray tube 100 M.A. may be used for 1½ seconds at 60 Kv.P. without damage. Consulting the half-wave rectified chart, this value is reduced to 75 Ma. and with self-rectified equipment, it is only 60 Ma. for the same exposure time and kilovoltage. Thus full-wave-rectified equipment allows the operator to use the x-ray tube to its fullest capacity.

TIMERS

Synchronous Timer:

To control the duration of the x-ray exposure different types of timers are employed. The most common type is the Synchronous Timer and as the name implies, it is operated by a synchronous motor which runs at a constant speed, depending upon the frequency of the incoming power supply. The dial of the timer may be set for 1/20 to 20 second exposure, which simply means the timer contacts are moved closer or further away and as the motor runs at a constant speed the distance between the contacts determines the exposure time. The synchronous timer is employed on x-ray generators not exceeding 300 milliamperes in capacity and for exposures not shorter than 1/20 second.

Impulse Timer:

Another type of timer is the Impulse Timer which is generally designed for high power equipment above 300 milliamperes. This is the most accurate type of timer for short exposures from 1/60 to 1/5 second. It is so designed that the current to the transformer is stopped or started at the zero or very near the zero point of the A.C. cycle. For example, consider the output of a 60 cycle full-wave generator, figure 22a. If the circuit were broken at:

"A" or 1 impulse, the time would be 1/120 second.

"B" or 2 impulses, the time would be 2/120 or 1/60 second.

"C" or 3 impulses, the time would be 3/120 or 1/40 second.

"D" or 4 impulses, the time would be 4/120 or 1/30 second.

"E" or 5 impulses, the time would be 5/120 or 1/24 second.

"F" or 6 impulses, the time would be 6/120 or 1/20 second.

And for 25 cycle operation, figure 22b, if the circuit were broken at:

"A" or 1 impulse, the time would be 2/50 second.

"B" or 2 impulses, the time would be 2/50 or 1/25 second.

"C" or 3 impulses, the time would be 3/50 second.

"D" or 4 impulses, the time would be 4/50 or 2/25 second.

"E" or 5 impulses, the time would be 5/50 or 1/10 second.

Milliampere-Second Timer:

Since a portion of the density on the x ray film is determined by the product of the milliamperage and the time of exposure, it is possible to use this factor in the construction of the milliampere-second timer. In use, the MAS Timer is set for the proper milliampere-second value for the part to

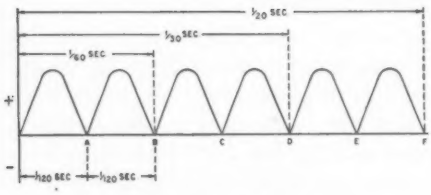


Fig. 22A. 60 cycle.
Full Wave Rectified A.C. (Kenotron).

be radiographed and when the timer reaches this pre-determined milliampere-second value, the exposure is automatically termined. The time range for this type of timer is from 1/20 to 20 seconds.

Spinning Top:

Figure 22a and 22b may be shown graphically on the x-ray film by means of a spinning top, a flat circular disc of opaque material generally brass, faced with lead, with an opening at one point along the circumference. If the top is placed beneath the tube on an x-ray film, made to revolve at an average speed, and an exposure made, say 1/20 second, a series of dots will be seen upon the film after development. Counting the dots, which simply represent impulses, the operator can readily determine the accuracy of the timer. In the above example for 60 cycle, full-wave-rectified equipment, six dots would be on the film, any more or less than this would indicate timer inaccuracies. It might be mentioned that the speed of the top has no effect other than the spacing between the dots. If the top is spun too slow, the dots will be close together, if too fast, too far apart; so much so they might be superimposed upon each other.

METERS AND CONTROLS

There are two general types of meters used with x-ray equipment, viz: ammeters and voltmeters and to a lesser extent the milliampere-second meter.

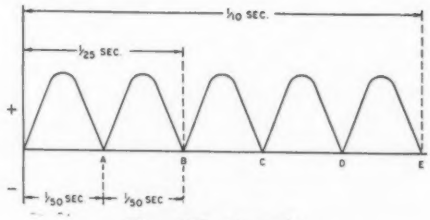


Fig. 22B. 25 cycle.
Full Wave Rectified A.C. (Kenotron).

Ammeters:

As outlined previously, the ammeter measures the current flowing through the filament of the x-ray tube. An increase in the ammeter reading indicates that more current is flowing in the filament circuit and hence the filament of the x-ray tube is heated to a higher temperature and more electrons are emitted. This condition is immediately reflected by an increase in the tube current which is measured by the milliammeter. Care should be exercised that the filament control is not set at too high a value, otherwise an excessive tube current will flow through the tube with resultant damage to the focal spot.

Milliammeters are generally equipped with a "high" and "low" scale. In older units, to change from the "high" to "low" scale, or vice versa, an external lever was employed.

In modern units, the scale is changed automatically to correspond with the focal spot to be used by means of the "technique selector," the technique selector being simply a switch which is operated manually and which automatically chooses the proper milliampere scale, depending upon what size focal spot is employed.

In the older type of unit, the ammeter and milliammeter were mounted in the high voltage side of the high tension circuit. This necessitated proper clearance from metal objects at ground potential with the result they were gen-

erally mounted in the overhead system where they could not come into physical contact with the operator.

In modern types of units, what are called grounded case meters, are employed, and are mounted directly on the control stand. Since they are at ground potential, there is no fear of high voltage electrical shock.

Milliampere-Second Meter:

Another type of meter used occasionally, is the milliampere-second meter, sometimes called a ballistic meter. It is simply a meter which measures the product of the milliamperage flowing through the x-ray tube and the time of exposure. For example, if 100 milliamperes flow through the tube for 1 second, the milliampere second value would be $100 \times 1 = 100$.

Since the milliampere-second meter registers the product of the milliamperage and the time of exposure, neither the time factor nor the milliamperage is accurately known. The meter is generally used in conjunction with a spinning top where the time factor can be accurately determined and hence the milliamperage.

The Ma.S. meter when employed with an impulse timer, can be used to advantage for pre-setting the filament when high milliamperages are employed; for at these high milliamperage values short exposures are absolutely essential for tube protection. On these short exposure values the conventional milliammeter does not read the true value owing to the inertia of its indicating needle.

Voltmeters:

The two types of voltmeters employed are the line voltmeter, sometimes called the voltage compensator meter and the pre-reading voltmeter or kilo-voltmeter.

The voltmeter simply registers the incoming voltage to the unit. If the incoming voltage is not constant and the only means of knowing this is by means of the voltmeter, then duplication of results would be impossible, for any variation in the incoming line voltage would upset the electrical characteristics of the entire x-ray circuit. (See section on voltage compensator.)

When the voltmeter is used to register the voltage impressed across the primary of the high-tension transformer, it is called a pre-reading voltmeter, and if calibrated directly in kilovolts, it is called a Kilovolt Meter.

Calibration Charts:

On some of the x-ray units, calibration charts are employed for the determination of the kilovoltage across the x-ray tube instead of a kilovolt meter, or a direct reading kilovolt selector.

With the voltage compensator meter reading directly on the line, each button on the auto-transformer represents a definite kilovoltage at a given milliamperage. As the milliamperage is increased the voltage output of the high-tension transformer decreases, in which case the auto-transformer button no longer represents the same kilovoltage as was obtained at the lower milliamperage. This is a typical property of all transformers and simply means that as the current through the secondary of the high-tension transformer increases (that is, the tube current or milliamperage increases), a voltage drop occurs across the x-ray tube. This must be compensated for by a higher auto-transformer button. The amount of increase is determined by the calibration chart, of which figure No. 23 is an example.

Consulting this calibration chart, it will be noted that when the tube cur-

rent is 10-20 ma., 70 kilovolts peak is obtained at auto-transformer button No. 28; and as stated above, for a given auto-transformer button setting the kilovoltage decreases with increasing tube current, it will be seen from the chart that for a tube current of 50 ma. button No. 30 must be employed to obtain 70 Kv.P., and at 100 ma. auto-transformer button No. 34

Units equipped with a kilovolt meter employ a line voltmeter which is pre-set before the exposure is made to compensate for the voltage drop in the transformer, depending upon what milliamperage is to be used. This type of line voltmeter is not only marked off in volts, but at certain points on the meter scale different milliamperage values are shown.

By adjusting this type of line voltmeter so that its indicating needle points to the milliamperage to be used, the voltage drop across the transformer is compensated for and hence the kilovolt meter reads the kilovoltage impressed across the tube.

However, owing to the fact the line voltmeter on the control stand must, of necessity, be equipped with a small scale, the percentage accuracy that the operator may pre-set the meter for the proper milliamperage to be used is low. Much greater accuracy as to the kilovoltage impressed across the x-ray tube is obtained by the use of calibration charts.

KILOVOLT SELECTOR BUTTON

Kv.P.	10-20 Ma.	30 Ma.	50 Ma.	60 Ma.	75 Ma.	100 Ma.	Kv.P.
33.0	1	2	3	4	5	7	33.0
34.3	2	3	4	5	6	8	34.3
35.7	3	4	5	6	7	9	35.7
37.1	4	5	6	7	8	10	37.1
38.4	5	6	7	8	9	11	38.4
39.8	6	7	8	9	10	12	39.8
41.2	7	8	9	10	11	13	41.2
42.5	8	9	10	11	12	14	42.5
43.9	9	10	11	12	13	15	43.9
45.3	10	11	12	13	14	16	45.3
46.6	11	12	13	14	15	17	46.6
48.0	12	13	14	15	16	18	48.0
49.4	13	14	15	16	17	19	49.4
50.7	14	15	16	17	18	20	50.7
52.1	15	16	17	18	19	21	52.1
53.5	16	17	18	19	20	22	53.5
54.8	17	18	19	20	21	23	54.8
56.2	18	19	20	21	22	24	56.2
57.6	19	20	21	22	23	25	57.6
58.9	20	21	22	23	24	26	58.9
60.3	21	22	23	24	25	27	60.3
61.7	22	23	24	25	26	28	61.7
63.0	23	24	25	26	27	29	63.0
64.4	24	25	26	27	28	30	64.4
65.9	25	26	27	28	29	31	65.9
67.2	26	27	28	29	30	32	67.2
68.6	27	28	29	30	31	33	68.6
70.0	28	29	30	31	32	34	70.0
71.3	29	30	31	32	33	35	71.3
72.7	30	31	32	33	34	36	72.7
74.1	31	32	33	34	35	37	74.1
75.4	32	33	34	35	36	38	75.4
76.8	33	34	35	36	37	39	76.8
78.2	34	35	36	37	38	40	78.2
79.5	35	36	37	38	39	41	79.5
80.9	36	37	38	39	40	42	80.9
82.3	37	38	39	40	41	43	82.3
83.6	38	39	40	41	42	44	83.6
85.0	39	40	41	42	43	45	85.0

Fig. 23. Typical calibration chart.

Filament Control (Rheostat):

During the operation of the x-ray unit, it is sometimes necessary to employ different milliamperages, depending upon the size of the focal spot in use.

In the majority of units, this is brought about by a manually operated control called the filament control or rheostat. By means of this control, more or less resistance is introduced into the filament circuit with the result the filament temperature is increased or decreased and as any variation in the filament temperature automatically increases or decreases the number of electrons liberated, then the operator has a convenient method of controlling the tube current manually.

In modern units a technique selector is employed which not only chooses the size of the focal spot, as well as the proper milliampere scale, but also au-

tomatically presets the filament temperature, and hence the tube current (milliamperage), to any value marked on the technique selector control.

A separate rheostat control is also used on the older units in fluroscopy as an added protection to the equipment as well as the patient. On modern units a certain amount of resistance is introduced into the circuit when the technique selector is set for fluoroscopy.

Stabilizers:

In the x-ray tube, since the current flowing through the tube consists solely of a stream of electrons flowing from filament to plate, it will be seen that any increase in the number of electrons given off by the filament will automatically increase the tube current (milliamperage). It has been found that even a very slight change in the filament current produces a considerable change in the tube current. In fact, a 1% change in the filament current will produce a 25% change in the tube current.

It will be seen then, that it is vitally important to maintain a constant filament current if a steady tube current is to be obtained and therefore consistent radiographic results. The filament circuit is usually connected to the ordinary commercial A.C. through a step-down transformer. This current has sometimes a tendency to fluctuate — fluctuations which will be reflected in a varying tube current. Under these circumstances, how can a constant tube current be maintained?

This is done by stabilizers, which maintain a constant tube current in spite of external voltage variations.

This may be done by either one of two types of stabilizers. First, the Kearsley Stabilizer, which is now more or less obsolete, and, second, the constant voltage stabilizer which is found on the modern type of equipment where line voltage fluctuations are a problem.

Circuit Breaker:

It is necessary to have some automatic device for disconnecting the x-ray apparatus from the power supply in the event of failure of any part of the circuit which might endanger other elements by reason of overloading. This device is called a circuit breaker, and is connected as close to the A.C. source as convenient. In operation, when an overload occurs, the contacts open automatically. It may be re-set by hand, but the cause for its action should be investigated and the trouble corrected before attempting to operate the x-ray unit again.

Magnetic Switch:

When the hand or foot switch of the x ray unit is closed by the operator, a circuit is completed whereby what is known as the magnetic switch is also automatically closed. This magnetic switch controls the current to the primary of the high-tension transformer. The need for this magnetic switch arises from the fact that the small contacts in the hand timer or foot switch in themselves cannot handle the heavy current involved in the primary of the high-tension transformer. To use a hand timer or foot switch for this purpose would involve the use of heavy contacts with a considerable increase in the size of their overall dimensions which would tend to make the hand timer or foot switch cumbersome and unwieldy.

After an interval of time, determined by the setting of the timer dial, the magnetic switch is opened and the exposure terminated.

Operation of a Full-Wave-Rectified X-Ray Unit (Figure 24):

When the main line switch (L) is closed, the circuit breaker (CB) the

filament transformer (FT), auto transformer (AT), and the motor of the timer circuit (T), are energized.

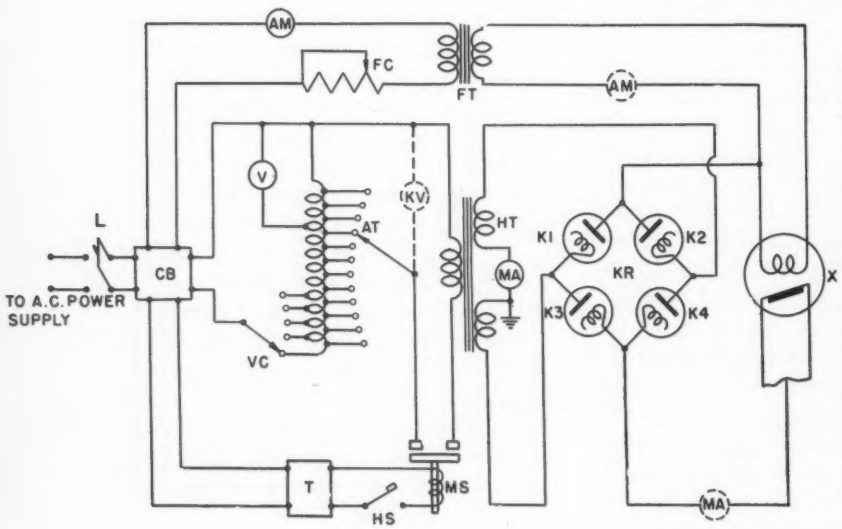
The voltage compensator meter (V) is checked for the proper reading. If it reads too high or too low, an adjustment is made by the voltage compensator control (VC). The autotransformer (AT) is adjusted for the proper kilovoltage and the timer (T) set for the proper exposure. The filament control (FC) is then adjusted for the proper tube milliamperage. This is done by noting the reading of the filament ammeter (AM).

When the patient is properly positioned, the hand switch (HS) of the timer (T) is closed. This actuates the magnetic switch (MS), closing the circuit to the primary of the high-tension transformer (HT). The voltage is stepped up by the transformer and after passing through the Kenotron rectifier (KR) is impressed across the x-ray tube (X). Since the filament of the x-ray tube has been previously energized, a copious supply of electrons is present and as the anode is now at a high positive potential, the electrons flow across the tube and upon striking the anode produce x-rays. The actual flow of these electrons is indicated by a reading on the milliameter (MA).

In figure 24, for simplicity, the filament transformers of the Kenotrons are not shown.

In older types of units, the ammeter and milliammeter (dotted lines) are connected in the high tension circuit. In modern units, grounded case ammeters and milliammeters (full lines) are employed and are mounted on the control stand. They are connected in the circuit as shown.

In some units, the kilovoltage is not marked off on the auto-transformer control nor is a calibration chart employed. With this type of unit, a kilovoltmeter is used and its position in the circuit is shown in dotted lines.



KEY

L.	Line Switch.
CB.	Circuit Breaker.
V.	Voltage Compensator Meter.
VC.	Voltage Compensator Control.
T.	Timer.
FC.	Filament Control.
AT.	Auto Transformer.
HS.	Hand Timer.
FT.	Filament Transformer.
MS.	Magnetic Switch.
AM.	Filament Ammeter.
K1.	Kenotron.
K2.	Kenetron.
K3.	Kenotron.
K4.	Kenotron.
KR.	Kenotron Rectifier.
MA.	Milliammeter.
X.	X-Ray Tube.
HV.	Kilovolt Meter.
HT.	High-Tension Transformer.

Fig. 24. Elementary Circuit Diagram for Full-Wave Rectified X-Ray Unit employing Kenotrons.

Travelling Chest Clinics

By N. NELSON, R.T.
Central Alberta Sanitarium, Calgary

MY first experience with portable x-ray was to assist in taking chest plates of very sick patients who could not be moved to the x-ray department. Later, I assisted in x-ray with a portable machine at Indian reserves where we rayed the school students. This was done with 14 x 17 films. A small room was converted into a dark room and trays were used for developing a few test films. The rest of the films were developed at the Sanatorium. This type of x-ray is expensive, the developing slow and the films take a great deal of filing space. These are some of the reasons why this system would not be practical in mass surveys.

Mass surveys have proven to be a great preventive and we hope that some day there will never be a case of advanced tuberculosis. It is quite a shock for a person to find he has to go to a sanatorium for even a few months, but to tell a person he has to spend his last few months there is hard to say and hard to face. Mobile x-ray by the method of photographing the fluorescent image is a modern and effective way to discover tuberculosis early and check the disease before too much damage has been done.

In 1943 the Alberta Tuberculosis Association bought a mobile x-ray unit in the form of a trailer, and put it in the hands of the Alberta government. The purpose of the machine is mass x-ray throughout the province. Last year another unit was purchased. This unit is a bus with a separate trailer with a high speed gas engine able to supply 25 Kv.A. This unit can therefore be used in remote places where there are no power lines.

Unit 1, which I have been operating since 1943, is as mentioned, a trailer. It is 20 ft. long, 8 ft. wide, 8 ft. 7 ins. high, with a ceiling of 6 ft. 6 ins. It weighs 4 tons and is pulled by a ¾ ton truck. It is equipped with electric brakes connected to the truck battery and controlled from the steering wheel. This makes it easy to handle. The 6-volt system is also used for running lights on the outside as well as in, for use in travelling.

The trailer is very compact inside. It has, as well as the x-ray machine, two lead lined partitions for the protection of the operators, cupboards for x-ray gowns, clothes closet for the staff, small dark room with tank and safe-light above it, lead lined box for storing films, a loading bench with a handy safe-light, and a suction fan for circulating the air.

The source of power is any line stepped down to 2300 volts and again connected to a 15 Kv.A. step-down pole transformer, or a 220 single phase source will do. With the trailer is a 150 ft. cable of No. 2 wire. If possible this cable should be connected directly to the transformer, or within a short distance of it. The single phase is necessary so that 110 volts can be used for lighting and heating the trailer. A 5 Kv.A. transformer in the trailer takes care of this. There are four 25 watt fluorescent lights and four 15 watt incandescent lights, as well as four 1200 watt electric heaters with fans.

The x-ray unit itself is a 200 ma. machine. The tube has a stationary anode

(2.2 — 5.2 mm.) and an electric fan mounted on the casing, which doubles the capacity of the tube. The greatest number of exposures we have been able to get on one tube is 60,000. The transformer is a full wave rectifying unit and is able to deliver up to 100,000 volts. The tube is 40 inches from the fluorescent screen. In front of the screen is a stationary grid which is necessary to cut out a great amount of secondary radiation. Extending from the screen is a light-tight box tapered to accommodate the camera. At the back of the camera is a film changer which holds a 4 x 10 in. film, so that stereos can be taken if desired. However, mostly singles are taken and we simply disconnect the tube shift. The screen and the tube are so attached that they both move up and down at the same time, so the tube is always in the proper position. We are now ready to photograph the fluorescent image.

When the source of power described above is obtainable we have the best success with high voltage: 90 kv., 150 ma. .1 to .6 seconds. If the power is not the best we have to compensate with longer time and lower voltage.

For photographing the fluorescent image the film used is high speed autochromatic film. This has a red backing and can be handled in ordinary red safe light used for photographic film. Orange light will slightly fog this type of emulsion.

Before the mobile clinic can visit a district it is necessary for some extensive organizing to be done. A local committee does this work, and they use schools and post-offices to get in touch with the people. After some publicity has been given, a "Request for X-ray" card is sent out to each family. On this card they write the names of the members in the family wishing x-ray, and the card is returned to the local committee. By card, the family is then given a day and a time to come. In this way the clinic is assured of steady operating.

Travelling with the Unit is a staff of three, two technicians and a receptionist. The unit is set up at the side door of a community hall or other suitable building. Between the hall and the trailer door we provide a canvas so that the trailer becomes a part of the building. Just inside the hall at this door the receptionist has her table so that she can regulate the flow of people into the trailer.

The people enter at the front door of the building where they stop at a table so that two volunteer helpers can register them. They carry their cards with them and proceed to the dressing rooms. The ladies are provided with gowns and instructions by another volunteer helper. Then they are ready for x-ray and their cards are exchanged for a piece of washed x-ray film numbered with greased pencil. The same number is written on the card. Five or six people are sent into the trailer at one time and they sit on a bench behind the control stand while awaiting their turn. Each person as he steps up to the fluorescent screen, hands his number to the operator. This number is put into a slot just back of the screen and is photographed with the chest. This number identifies the film.

Films are mailed to the Sanatorium daily. Here they are developed and made ready for reading. One thousand 4 x 5 films can be developed in a five gallon tank before the solution should be changed. The reports are mailed out from the Sanatorium.

The 4 x 5 stereo films are often used at the Sanatorium for clinics, instead of a 14 x 17 single, and the doctors have said they are very satisfactory.

Corporations—

What They Are and How They Function

By P. E. HUNT, R.T.

Saskatoon, Sask.

Introduction:

AS the Canadian Society of Radiological Technicians is a corporation, and as there seems to be much confusion of thought among the members as to the meaning and function of a corporation, an attempt is made herewith to clarify the picture.

It is not to be inferred that the author knows all the answers. Far from it. The information and statements made herein are compiled from his own experiences as an executive officer with many organizations, and from reading material which is accessible to any individual using a public library. No attempt has been made to cover every possible angle of this subject, but only to point out what would seem to him to be those features which need such clasification.

If the article stimulates discussion, and by so doing results in a better understanding by all of us, the author included, concerning the administration of the affairs of the C.S.R.T., it will have accomplished its purpose.

What is a Corporation?:

A corporation could be described as a group of persons endowed by the State with certain rights and privileges. The corporation is a creation of law and all its rights, powers and duties are derived from legislation. The act of incorporation involves a contract between a group of persons and the State. In Canada, powers are conferred upon corporations under various Canadian Companies Acts, or by a special act, or by letters patent. The corporation can enlist the services of the State to secure privileges, but we must also remember that when we incorporate we shoulder obligations and responsibilities. Not the least of these, is to conduct the business of the corporation in a manner acceptable to, and according to the terms of the contract with the State. It is to be expected that the State will at all times keep the corporation under close supervision.

What Are Its Rights, Powers and Privileges?:

A corporation is granted the right to carry on a certain business in a certain place, or places. It has the right to have a corporate seal, which follows the right to use a corporate name. Contracts bearing the impression of that seal are binding to the corporation.

The powers of the corporation are in the main of two types, express powers and incidental powers. The express powers are outlined in the Charter, which the corporation is granted by the State. Incidental powers include those privileges which are reasonably necessary to carry out the express

powers. The State may dissolve a corporation, which exceeds its powers, express or incidental.

Control of a Corporation:

The Acts lay down that the affairs of a company are to be managed by a Board of Directors. The method of formation of the Board of Directors is outlined in the proposed by-laws of the corporation at the time of applying to the State for permission to incorporate. The State, therefore, having approved just how that Board shall be formed, it then becomes the responsibility of the Board to see that the affairs of the corporation are carried out according to the terms of the contract between the State and the corporation.

To assist the Board of Directors to so function power is expressly given to them to pass by-laws for certain purposes, and this has been held in effect to take away from the general body of the members the right to originate by-laws concerning those matters. Control is thus determined by the judicious drafting of by-laws. By-laws which are contrary to any provision of law or which make it possible to show preference for one group of members more than another are not judicial and should, therefore, be avoided.

The members do not control the corporation but use a Board of Directors, who are the authorized agents and managers. These Directors do not act separately but as a unit. It is an almost universal custom for the members to ratify at the annual meeting the actions of the Directors during the preceding year. Questions affecting the whole body of members cannot be decided by the Board of Directors, unless such questions are first put to the members and receive the assent of a majority. Quite often matters are placed before the general body of membership which do not require their assent but are more satisfactorily settled that way.

On the other hand, members cannot interfere in matters of internal management by initiating by-laws without the consent of the Board. They must wait to pass upon the by-laws submitted by the Directors. It has been said that a Board which persistently refuses to take such action as the general body of members desires should be replaced by a more pliable Board!

Committees:

To facilitate the carrying out of the business of the corporation the Board of Directors often arrange for committees to function for certain purposes. Finance committees, laws committees, committees on resolutions, convention committees and so on. These committees are responsible to the Board, and the actions of such committees are usually subject to revision or alteration by the Board of Directors.

Some committees are temporary, that is, they are appointed for the purpose of carrying out certain specific business, and when this has been dealt with and a report given to the Board of Directors, or to a meeting of the general body of members, the committee disbands.

Other committees are permanent, or "standing" committees. Such committees exist to carry on business which is likely to exist during the whole life of the corporation. The personnel of "standing" committees may change

from time to time, but the committee, as such, never ceases to function. Such committees usually report to the Board of Directors or to a general meeting of the body of members at least once a year.

What of the C.S.R.T.?:

As was previously mentioned, the C.S.R.T. is a corporation. It functions as such by virtue of Letters Patent granted by the State. We have a corporate seal and a corporate name. The original contract with the State was signed by the following seven individuals:

W. H. McGuffin, M.D.
W. K. Colbeck, M.D.
F. G. Reason
C. J. Bodle
Mary F. Cameron
Sadie Storm
Rosemary O'Hagan

and is dated May 1st, 1943.

The Letters Patent set out that we shall:

(a) Promote and encourage the science and art of radiological technique and consider and discuss all subjects affecting it;

(b) Promote the formation of, assist, guide, encourage and form a central association for local associations of radiological technicians throughout Canada;

(c) Facilitate the exchange of information and ideas on matters affecting the science and practice of radiological technique and allied subjects;

(d) Print, publish, sell, lend and distribute the proceedings or reports of the corporation, or any papers, communications, works or treatises on radiography or its applications or subjects connected therewith, or any abstracts thereof, or extracts therefrom;

(e) Promote and provide for the carrying out of research and experimental work in connection with radiography and allied subjects, and make, institute and establish grants, rewards or other benefactions in connection therewith;

(f) Establish and maintain libraries and museums, and promote, organize and conduct exhibitions of apparatus, plant and processes connected with radiographic science and practice;

(g) Establish, undertake, superintend, administer and contribute to any charitable and benevolent fund in connection with or for the benefit of persons engaged in the science and practice of radiography and allied subjects and of their dependents;

(h) Invest the monies of the corporation not immediately required in such manner as may, from time to time, be determined;

(i) Associate, affiliate and federate with any association, society or organization, incorporated or unincorporated, with objects the same as, or similar to, the objects of the corporation;

(j) To all such other lawful things as may be incidental or may be deemed to be conducive to the attainment of the foregoing objects or any of them; provided that if, upon winding up or dissolution of the corporation, there remains, after the satisfaction of all debts and

liabilities, any property whatsoever, the same shall be given or transferred to some other corporation, society or institution or societies or institutions not formed or carrying on business for profit, having objects similar to the objects of the corporation, to be determined by the members.

These, then, are the express powers of the corporation. Its incidental powers would therefore include those privileges which are reasonably necessary to carry out those express powers.

Formation of the Board of Directors:

The method of formation of the Board of Directors is outlined in the by-laws under Sections 9, 10 and 11. There are five members of this Board and these hold office for a term of two years. One is appointed by the Canadian Medical Association, one is appointed by the Canadian Association of Radiologists, one is appointed by the Member-Society, two are appointed by the general body of members.

It is interesting to note that of the two directors elected by the general body of members, one acts as the vice-president and secretary-treasurer and the other as president. The formation of the first Board of Directors was so arranged, with the consent of the State that subsequent of the original formation, the general body of members would annually elect one member to the Board. This member would serve as vice-president and secretary-treasurer during his first year and as president during his second year.

We have, also, nine associate directors, who function as liaison officers between the Board of Directors and the Member-Societies. These associate directors are appointed by the executive officers of the various Member-Societies.

Committees:

There have been and still are many committees functioning within the structure of the C.S.R.T. At the present time perhaps the three most important are:

The Examining Board,
The Board of Directors of
The Focal Spot,
The Resolutions Committee.

Arrangements are being made to provide all registered members of the C.S.R.T. with a copy of the by-laws of the corporation. Sufficient copies will be sent to secretaries of each Member-Society as soon as they become available from the printer.

REFERENCES:

Modern Business, Volume 3, Business Management—Alexander Hamilton Institute.
Rules of Order—Bourinot.
Essentials of Parliamentary Procedure—Moore.

The Focal Spot

Journal of the Canadian Society of Radiological Technicians

EDITOR
LESLIE J. CARTWRIGHT

Volume 3 *JULY, 1946* *Number 3*

"All our ambitions should be devoted to a faithful fulfilment of duties towards others as well as to ourselves."—Roentgen.

EDITORIAL COMMENT

THE new era, of which we have heard so many glowing promises for the past six years, is with us. Far fields always look greener and in the same way the future usually looks more rosy than the present. These days of the beginning of the post-war period are not ideal in many ways. We still have many annoying restrictions, shortages and many other results of a world-wide upheaval to contend with; although we on the North American Continent are fortunate indeed when we compare our lot with that of those in Europe and other war-ravaged areas. However in spite of the numerous minor irritations which still beset us, the fact must be evident that these times hold the germs of an entirely new epoch, a better one if we as a people make it so.

As x-ray technicians our Society seems to have been formed at just the right time. It has taken root and needs only a little trimming here and there by means of a few relatively minor constitutional changes which working experience as against theoretical ideas may show to be desirable, to constitute a well adjusted machine functioning for the benefit of radiographers and radiography.

We are undoubtedly on the eve of great development. We will see new equipment and new techniques. We will have a number of new members as the technicians from the forces become established in civilian x-ray departments. We should welcome and absorb these new members and make them feel they "belong." With hospital space so heavily overtaxed all over the country, new buildings will be going up as soon as material is available and with the ever-increasing public participation in hospitalization insurance it appears that these new buildings will be filled as soon as they are built.

Our Society must keep pace with this progress and this cannot be done by 90% of the members watching the other 10% work. It is essential that every member should do his part in some way or other if we are to have the live organization we should have. The Society is naturally officered by men and women who have had experience along those lines, but there is constant need for recruits from the rank and file of the membership. Unless individual members make themselves felt it is often difficult to know who will make good future officers. Moreover the officers themselves are stimulated by a live membership. Diffidence is natural in many of the younger members, but it should be overcome if they wish to get the most out of their Society. Most of us older members have experienced it in ourselves but can look back with satisfaction to the time when we overcame it and allowed ourselves to take full advantage of the opportunities offered for development. So if all members will do something, even if it is only asking questions or making suggestions at their local meetings, our Society will develop and expand in the same ratio as its individual members.

MAKE THE MINUTES COUNT

The Fourth Annual Convention — the first peace time convention — will soon be with us and we hope for a good attendance, constructive discussion and action following the discussion. The Editor feels that possibly he is going beyond his sphere in making the following suggestions, pertaining, as they do, to the running of the Convention or rather of the Annual Meeting. However he feels that if they could be put into effect it might be possible to accomplish more in the very limited time available for discussion of the Society's business. In the past so much time has been consumed on certain controversial matters that the Annual Meetings have often terminated with many important matters not brought to a final decision and some not even dealt with. Therefore would it not be possible at the coming Annual Meeting to find out ahead of time approximately how many matters have to be dealt with and allot a maximum to each, according to its importance, thereby allowing some time at least for consideration of ALL matters of importance which should be discussed. With three sessions of not more than two and a half hours each available and perhaps a couple of hours more at an extra evening session, there are barely ten hours for the consideration of the past year's accomplishments and the future year's proposals and from this time there must be deducted the time for reading reports and minutes, financial statements and voting, and other routine business. So it seems that if those taking part in the discussions will think clearly and without prejudice and avoid arguing in circles, much more could be accomplished for the real benefit to the Society. In this connection we have received from the Secretary a general outline of the Agenda for the Businss Meetings at Niagara and it is printed on page 124.

PLEASE BE PUNCTUAL

At the Montreal Convention last year one of the many commendable features was the rigid time-schedule adhered to. May we urge those taking part in the Niagara Falls Convention to co-operate with the committee by being right on time for the various items on the programme.

HOW ABOUT A C.S.R.T. ANNUITY FUND?

We notice in the Ontario Provincial News, Eastern Section, in this issue a mention of a suggestion presented at a recent meeting at Brockville regarding the possibility of arranging an annuity scheme for members of the Canadian Society of Radiological Technicians. We know nothing whatever about it beyond this bare mention of the fact, but it started us thinking and it seems as if it could be quite practicable. Taking the hypothetical 600 members which we took as a basis in the suggested insurance scheme in the April issue and presuming that each member contributed a dollar a week or fifty dollars a year, there would be $30,000 a year coming in, which if it could be invested at 5% (which we fear is over-optimistic at the present time) would bring in $1,500 interest the first year and considerably more thereafter. Or it might be more practical to see if some group annuity arrangement could be made with an insurance company. If you will refer to Mr. Hunt's article in this issue on "Corporations" you will notice that item (g) of the constitution permits the Society to handle a matter of this kind. We suggest that some member take this and the insurance scheme mentioned in the last issue under his wing and present it for conideration at the forthcoming Annual Meeting.

RESOLUTIONS COMMITTEE

The Secretary announces the formation of the Resolutions Committee as follows: Chairman: Mr. W. J. Doern, General Hospital, Winnipeg; Mr. Herbert M. Welch, Colonel Belcher Hospital, Calgary; Mr. J. H. Coones, Peterborough Clinic, Peterborough, Ont. All correspondence concerning resolutions to be considered at the Annual Meeting should be addressed to the Chairman of this Committee.

Of the original committee, as outlined above, Mr. Doern will act as Chairman for this year, and then retire. Mr. Welch will serve for two years, and during his second year will act as Chairman. Mr. Coones will serve for three years, and during his third year will act as Chairman. The formation of this committee was planned in such manner that future members would hold office for a term of three years, with one member retiring each year with that member serving his third year acting as Chairman. Appointments to this committee will be made annually by the Board of Directors from those persons nominated by the general body of members. It will be seen, therefore, that all official delegates to the Annual General Meeting should carry with them the names of one or more individuals sponsored by the general body of members to be nominees to this Resolutions Committee.

RE APPLICATION FORMS AND CURRICULUM

Specimen copies of the above are in the hands of all Directors, Associate Directors, Members of the Board of Examiners, and Secretaries of Member Societies. Following a final "editing" by these individuals, copies will be printed and distributed throughout Canada for general use. It is hoped that this may be accomplished before the Annual Meeting. Since the above was printed we have received from the Secretary copies of the Syllabus and Application Form. While these are at present in a tentative form, it is not likely that they will be fundamentally altered. We are therefore publishing them in this issue and they may be found on pages 158 and 159.

DIPLOMA COMMITTEE

The Committee on Diplomas or Certificates of Membership has got down to the final selection of a design and is hoping to have the engraving done and the certificates in the hands of at least some of the members before the Annual Meeting. Forms will shortly be sent to Provincial Secretaries asking for full particulars regarding names of those of their members who are fully qualified R.T.'s and entitled to the diploma. Secretaries can expedite this matter by starting to prepare their lists now.

CONVENTION PAPERS AND EXHIBITS

Mr. J. H. Coones, Peterborough Clinic, Peterborough, Ont., in charge of Technical papers and exhibits at the Convention wishes all members who are showing films or gadgets to get in touch with him at once. He also has vacancies for a few more technical papers and would greatly appreciate members intending to give these contacting him immediately.

MEMORIAL ARCH AND OAKES GARDENS, NIAGARA FALLS, ONT.

EDITORIAL COMMENT

NIAGARA—THE PERFECT CONVENTION "FOCAL SPOT"

Convention plans are proceeding apace and a meeting of the Convention Committee was held a few days before The Focal Spot went to press. The Convention, as we trust all members know by now, will be held at the General Brock Hotel, Niagara Falls, on September 26th, 27th and 28th. It will be a few weeks before the detailed programme is complete and it will then be mailed to all members. A prominent speaker will address the members at the Annual Banquet. Many technical papers will be given and it is good news that among the speakers will be Mr. Mahoney of the Educational Department, Victor X-Ray Corporation, whose address at the Montreal Meeting last year was one of the high spots of the Convention.

Of course the Business Meetings are of particular importance this year with a number of important subjects billed for discussion. With the programme to be sent to members will be a hotel reservation form and it is hardly necessary to stress the importance of attending to this matter promptly.

For the entertainment of Convention personnel, sightseeing tours are being arranged for in chartered buses. These will include the Whirlpool Rapids, over which a trip may be made in a cable car suspended across the cliffs of the Gorge; Niagara Glen and many other points of interest. The Glen is a beautiful forest walk through a landslide of huge rocks by the edge of the foaming rapids, the noise of which forms a continuous thundering background. Many centuries ago this was the site of the Falls, as shown by round "pot holes" and other evidences of erosion on the rocks. The Glen is overlooked by many who are very familiar with the Falls and yet in actual beauty it really surpasses the Falls themselves. It is worth making a special effort to visit and should be a trip in itself, allowing at least an hour to appreciate its beauties. The region abounds in historic interest. There is Fort Niagara on the U.S. side at the entrance to the Niagara River. It was here that Father Hennepin landed in 1678, the first white man to see the Falls. La Salle followed him and the following year completed the building of the "Griffon," a 60 foot ship of 45 to 60 tons, a miracle of pioneer forest building in 1679. She was built at Cayuga creek above the Falls and was the first ship to sail the Upper Lakes. Fort Niagara, a solid stone structure, was built by the French around 1700, was taken by the British in 1759 and by the Americans in the War of Independence.

On the Canadian side of the Niagara River is Queenston with many historical associations. There is Navy Hall built by the British in 1775 and once used as a meeting place for the first Parliament of Upper Canada and residence of Governor Simcoe. Fort George erected by the British in 1783 after the Revolutionary War. The star-shaped Fort Mississauga built in 1813. The home of William Lyon Mackenzie. The Laura Secord Monument. Brock Monument, a column 185 feet high standing on a hill top, marking the point where General Brock fell at the battle of Queenston Heights in 1812. There is a spiral staircase in this column and those with good physique and strong heart and lungs can climb and admire the widespread view obtained from the top. At the Falls themselves the Oakes Garden forms a beautiful foreground for the Falls, with its formal arrangement of stone walls with climbing roses, its stone stairs, terraces and colonnades. Then there is the observation tunnel under the Horseshoe Falls, the trip in the steamboat Maid of the Mist into the spray of the Falls, the Cave of the Winds on the U.S. side and of course the spectacular illumination of the Falls at night. We do not want to tempt you away from your duties at the Convention but do suggest that when you are there it would be worthwhile to try and stay an extra day or two to explore the many points of interest in the district.

Syllabus of Training for Technicians

1. PHYSICS (Elementary)—Heat, Light, Electricity, Fundamental Electrical Concepts, Electric Currents and Potentials, Direct and Alternating Currents, Electro-Magnetism and Induction.

2. ELECTRON THEORY and X-RAY TUBES—Electron Emission and Acceleration, X-Ray Tubes and Valve Tubes (all types). X-Rays—Nature and Place in Electro-magnetic Spectrum, Properties of, Wave Length, Basic Factors, Voltage, Milliamps, Time, Distance.

3. X-RAY APPARATUS—Types of Generators, Half Wave, Full Wave, Three Phase, etc. Transformers (all types). Rectification, Valve Tube and Mechanical Rectifiers, Meters, Voltmeters, Ammeters, Milliameters.

4. ELECTRICAL and RADIATION DANGERS—Protection — Radiation — tolerance, dose, Radiography, Fluoroscopy, Therapy.

5. ANATOMY and PHYSIOLOGY—Development and Morphology of Human Skeleton (Elementary), Different Types of Joints. Upper and Lower Extremities, Spinal Column, Ribs, Pelvis, Surface Markings and position of principal organs.

6. TERMINOLOGY and NOMENCLATURE.

7. RADIOGRAPHIC TECHNIQUE — Effect of Basic Factors, Density, Contrast, Detail, Distortion, etc. Use of Intensifying Screens, Use of Cones and Diaphragms, Use of Bucky Diaphragm and Stationary Grid, Effect of Motion, Measurement of Focal Spot of Tube.

8. PRACTICAL RADIOGRAPHY — Positioning of Patients for Radiography of various parts of the body. Slow and Rapid Techniques, Soft Tissue Work, Voltage-Thickness Technique, Milliampere-Thickness Technique (with Optimum Voltage), Stereoscopy, Calibration of Machine, Care of Apparatus. Preparation of Technique Chart.

9. PROCESSING PROCEDURE— Dark Room. Chemisty of Same. Time. Temperature. Care of intensifying screens.

10. ETHICS and DEPARTMENTAL PROCEDURE—Preparation of Patients for Examination, Preparation of Opaque meals, enemas, etc. Asepsis for Radiographic Departments. Relationship of Doctor, Patient and Technician.

11. THERAPY APPARATUS — Tubes, Protective devices, etc.

12. MEASURING INSTRUMENTS — Current and Voltmeters, Sphere Cap, Ionization Methods. Unit of X-radiation. Measurement of "Quality" of "Hardness." Half-value layer. Effective Wave-length.

13. FACTORS AFFECTING INTENSITY DELIVERED TO THE SKIN—Current, Time, Voltage, Focus-skin Distance, Filters, Size of Field, Quality of Radiation.

14. FACTORS AFFECTING PERCENTAGE DEPTH INTENSITY—Size of Field, Focus-skin Distance, Voltage, Filters, Filter materials, Composite filters.

TEXT BOOKS RECOMMENDED

Anatomy and Physiology for Nurses—Kimber & Gray.

Radiology Physics—Robertson.

Roentgenographic Technique — Rinehart (latest edition).

Roentgenologic Technique—Sante (latest edition).

Elementary Photographic Chemistry — Eastman Kodak Co.

Practical X-ray Treatment—Erskine.

SUPPLEMENTARY READING

Positioning in Radiography—K. C. Clark.

EXAMINATIONS

Examinations shall consist of two parts:

(a) Written;

(b) Practical.

The written examination shall be divided into the following five subjects:

1. Anatomy;
2. Physics and Apparatus;
3. Radiographic Technique;
4. Darkroom Service;
5. Therapy.

The practical examination shall consist of a specified number of demonstration films of such subjects as the examiners shall indicate; and shall be graded on all aspects of x-ray and dark room technique involved.

To be successful in the examination the candidate must obtain an average of 60% or over in all subjects and a minimum of 60% on each and every subject. Failure in more than two subjects will necessitate re-examination in all subjects.

ATTENTION OF ALL MEMBERS

A committee is at present working on the issuing of C.S.R.T. Membership Certificates, and have sent a letter to all Secretaries of Member Societies requesting the following information:

1. Name as desired on certificate, whether initials or full Christian name or names.

2. Any degree the member is entitled to, such as R.N., etc.

As most Member Societies are not holding meetings during the Summer months, there may be some difficulty in contacting all our members to obtain this information. Will all our members please help by sending the above information to their Provincial Secretary as soon as possible, and remember that certificates cannot be issued to members entitled to same until such information is received.

—H. M. WELCH.

Application for Membership C.S.R.T.

Mr.
Mrs.
Miss .....
(Surname) (Please Print) (First Name)

( ) Business Address* .....
(Hospital or Office) (Street) City) (Province)

( ) Home Address* .....
(Street) (City) (Province)
(* Indicate address to which mail should be sent.)

Date of Birth ..... Birthplace .....
Married ..... Single .....

QUALIFICATIONS

The following data must be completely filled in:

Preliminary Education:

Grade School .....
Name City Prov.
From ..... To .....
Date of Graduation .....
High School .....
Name City Prov.
From ..... To .....
Date of Graduation .....
College .....
From ..... To .....
Date of Graduation .....

Supplementary schooling (night school, business courses, etc.). Give name of schools and dates:

.....
.....
.....

Documentary evidence must be submitted to support data in regard to high school graduation or supplementary education submitted in lieu of uncompleted high school.

Nursing Training:

Years of Training .....
Date of Graduation .....
Registration No. .....
Training School .....
Name City Province

Disposition — Member — Society:
Application received .....
Date .....
Application approved .....
Date .....
Application rejected .....
Date .....
Candidate advised .....
Date .....

1. .....
Member — Society
2. .....
President
3. .....
Secretary

Student applicants will complete the remainder of this application form at the end of training period, and before writing examination.

X-ray Training (do not include short commercial courses):

.....
(Place of Training) (Dates) (Inst. or Radiologist)
.....

If Registered Technician, state particulars:

.....

X-ray Experience (Doctor's Office, Hospital, etc):

.....
(Place) (Dates) (Radiologist)
.....
(Place) (Dates) (Radiologist)
.....
(Place) (Dates) (Radiologist)

Present place of employment .....
Total years' experience, including training .....
To which Member Society do you belong?
.....

In consideration of the granting of a certificate by THE CANADIAN SOCIETY OF RADIOLOGICAL TECHNICIANS, the undersigned agrees to perform the work and duties of an X-ray Technician strictly, in accordance with the Rules and Regulations of the Canadian Society.

Signature of Applicant .....
Date .....

APPLICANT WILL NOT WRITE IN THESE SPACES

Approved by Board of Examiners, C.S.R.T.:

1. .....
(Chairman) (Date)
2. .....
(Vice-Chairman) (Date)
3. .....
(C.S.R.T. Representative) (Date)

Application Received .....
Payment of Fee .....
References .....
Action of Board .....
Assignment of Exam. .....
Return of Exam. .....
Grade (Ques.) .....
(Films) .....
Certificate Issued .....

QUALIFICATIONS REQUIRED FOR WRITING C.S.R.T. EXAMINATIONS

Educational: Junior Matriculation or its equivalent.

Training: Two years' training under qualified Radiologists.

If applicant does not qualify under the above regulations the application will be submitted to the Board of Examiners of the Canadian Society of Radiological Technicians for their decision.

Note: Examination Fee of five dollars ($5.00) with application to write examination.

Remarks:

News Items from the Provinces

MANITOBA SOCIETY OF X-RAY TECHNICIANS

During the regular meeting of the Manitoba Society, which was held Wednesday, April 10th, we had the great pleasure of listening to Dr. A. E. Childe, formerly of the Neurological Institute of Montreal. Dr. Childe presented an instructive talk on "Radiography of the skull." To illustrate his subject Dr. Childe showed interesting films that were taken overseas.

The May meeting of the Manitoba Society of X-Ray Technicians was held in the Board Room of the Winnipeg General Hospital on Wednesday, May 8th. After a brief business meeting Mr. Wm. Doern presented two technicolor films. One on "The removal of cataract of the eye" and the other on "The cleft palate." The films were superb.

Special thanks were tendered to Mrs. Una Hardy of the programme committee for her splendid co-operation and hard work in preparing programmes for each meeting. Mrs. Hardy is leaving our midst and will not be with us after the holiday season.

As this is our last meeting until the Fall we hope every one has a very pleasant holiday.

—M. STESKI, R.T.,
Sub-Editor.

NOVA SCOTIA SOCIETY OF RADIOGRAPHERS

The Sixth Annual Meeting and Refresher Course was held in Halifax on May 15, 16 and 17. The official opening took place at 10 a.m. on Wednesday morning, May 15th, when Mayor J. E. Ahern delivered an address of welcome on behalf of the City of Halifax. There was a good attendance from all points in Nova Scotia. The morning and afternoon sessions on the first day were held at the Halifax Infirmary. The programme on this day, in addition to the Annual Business Meeting, included papers by Prof. W. J. Archibald of Dalhousie University on Physics, "Tips and Tilts" by Norman Hurst, R.T., of Victoria General Hospital; Venography by Guy W. Stanford, R.T., of the R.C.N. Hospital, Halifax, and Rib and Spine Technique by Albert Perry, R.T., Camp Hill Hospital. In the evening a banquet was held at the Nova Scotian Hotel at which the guest speaker was Dr. Norman H. Gosse, of the Nova Scotia Cancer Society. Dr. Gosse gave a comprehensive address on cancer, its growth and known methods of treatment. "You often hear someone say," said Dr. Gosse, "'If they could only find a cure for cancer!' but it is not just one cure but possibly 60 or 70 for the many varieties of the disease, that we need. Cancer is derived primarily from a body cell," Dr. Gosse said, and explained the multiplication of cells until growth of the body stops. Reproduction of cells then continues at a rate to replace only worn out cells. It is when a chronic irritation, such as a sharp tooth against the tongue, causes an ulcer, or some other factor releases the normal control upon the cells that they revert to their primitive state, and rapidly reproduce without function. "That is cancer," he said.

Dr. Gosse told the members the primary object of the Canadian and the Nova Scotia Cancer Societies is education; to teach people the importance of early signs of the disease. The provincial society hopes eventually to reach every home in the province, Dr. Gosse said. Objects are also to assist in bringing poor to centres for treatment, clinical research and laboratory research.

Albert Perry, Associate Director to the Canadian Society of Radiological Technicians, and N. Hurst, retiring president of the Nova Scotia Society, thanked the speaker. George Harrison, of the Nova Scotia Hospital, was chairman.

On the following day, Thursday, May 16th, the sessions continued at Camp Hill Hospital. Papers included Bronchography by Dr. T. M. Sieniewicz, Urography by Dr. A. Anderson of Camp Hill Hospital, Radiography of the Broncial Tree with Iodized Oils by G. G. Harris, R.T., Nova Scotia

Sanatorium, "Special Positions" by Dr. R. L. Smith, Radiologist, Camp Hill Hospital, "Care of Apparatus" by Mr. Brunning of Ferranti Electric Co., Lateral Radiography of the Hip by E. Zwicker, R.T., Camp Hill Hospital, and concluded with a Round Table Discussion and Question Box under the chairmanship of Dr. C. M. Jones, Halifax Infirmary. The second day ended with supper at Camp Hill Hospital by the courtesy of the Administrator. The third day's sessions were held at the Halifax Infirmary and the papers were "Vocational Opportunities in Radiography" by Miss Neva Harley, R.N., R.T., Halifax Infirmary; "Basic Factors in X-Ray," Dr. C. M. Jones, Halifax Infirmary; "What the Radiologist Expects of the Technician" by Surg. Lt. Cdr. J. H. Flemming, R.C.N. Hospital, Halifax; "Uses and Abuse of Coolidge Tubes," Mr. E. H. Hollingum, General Electric Corporation; "Relation of Surgeon to Technician," Dr. Noble, Camp Hill Hospital, and "Problems of the X-Ray Department," Sister Mary David, R.N., R.T., Halifax Infirmary. The afternoon concluded with a tasty buffet lunch. The following officers were elected at the Annual Meeting:

President—Miss Neva Harley, R.T., Halifax Infirmary.

Vice-President—Albert Perry, R.T., Camp Hill Hospital, Halifax.

Second Vice-President — Sister Mary Roberta, R.T., St. Rita's Hospital, Sydney.

Secretary-Treasurer—Mrs. Chester Campbell, R.T., Halifax.

Executive Members—Murdock McLean, R.T., Sydney Hospital, Sydney; Sister Mary David, R.T., Halifax Infirmary.

Associate Director to the Canadian Society —Albert Perry, R.T., re-elected.

Having concluded another of the popular Refresher Courses the Executive are sitting back reviewing their efforts and feeling satisfied with a job well done.

Most gratifying are the remarks heard from all quarters, "The best yet," "Very constructive," "Can we have longer periods?"

Have you experienced trying to arrange a programme of this type? If not, as a suggestion to all, get in on one of the Committees, and you will very soon realize the volume of work entailed, more particularly when feeling all is ready and in order, out of the blue comes a cancellation of a paper or demonstration; this is where the big headache commences — just a little extra for good measure . But stick to it! See it through! And we assure you it is most interesting, constructive, and educational from the individual viewpoint. The memories will live with you always and you will relax with others hearing gratifying comments of "A job well done."

Front row, left to right: A. Perry, Camp Hill Hospital; Sister Robert, Saint Rita's Hospital, Sydney; Sister Thomas Joseph, Halifax Infirmary; Sister Patricia, Sacred Heart Hospital, Cheticamp; Sister Mary David, Halifax Infirmary; Sister Edmund Campion, Halifax Infirmary; Sister Mary Roselina, St. Martha's Hospital, Antigonish. Second row, left to right: Evelyn Thomas, St. Martha's Hospital, Antigonish; Margaret Mury, St. Joseph's Hospital, Glace Bay; Ethel Wells, Newfoundland Sanatorium; Jessie McLaughlin, Aberdeen Hospital, New Glasgow; Dorothy Gunn, Aberdeen Hospital; Margaret Blandford, Colchester County Hospital; G. A. Thompson, West Kings Memorial Hospital; Norman Hurst, Victoria General Hospital. Third row, left to right: G. G. Harris, Nova Scotia Sanatorium; Murdoch McLean, Sydney Hospital; Leading Wren Eleanor LaCroix, Royal Canadian Naval Hospital; Eunice MacDonald, Mary Tobin, Neva Harley and Jean Fry, all of Halifax Infirmary; Petty Officer Reginald Potts, of the Royal Canadian Naval Hospital.

ONTARIO SOCIETY OF RADIOGRAPHERS

EASTERN SECTION

The Eastern Section of the O.S.R. held their spring meeting on May 4th, 1946, at 3 p.m., in the Manitonna Hotel, Brockville. There were members present from Belleville, Kingston, Brockville, Smith Falls, Ottawa, Peterborough and Cornwall, making a total of 40 in attendance.

Miss Grace Froats, president of our section, introduced the speakers. Dr. D. Budge, Radiologist from the Jewish General Hospital, Montreal, gave an extremely comprehensive paper on the "Technical Aspects in the Examination of the G. I. Tract."

Dr. K. Faulkner, Radiologist of the D.V.A. Hospital, Kingston, who has recently returned from overseas, told us of the trials and tribulations accompanying the production of "X-rays in a Forward Area."

"Radiography of the Hip Joint" was the topic chosen by Mr. Richard Williams of the Belleville General Hospital.

At the business meeting which followed it was decided to have the fall meeting at the Manitonna Hotel in Brockville, the date and time to be arranged by the executive.

A letter, illustrating the possibilities and value of an annuity for the technician as a member of the Society, was read by the Secretary.

Following tea, Rev. Sr. Margaret Mooney of Hotel Dieu Hospital, Cornwall, showed us some camera snaps "blown up" and printed on x-ray film. Her brother, Sgt. Mooney, had taken these scenes in Italy and some fine views of the famous landmarks, as well as the unique method of reproduction, were enjoyed thoroughly by all present.

Rev. Sr. Mary Vincentia of Brockville, moved, and Miss Menzies of Ottawa seconded the motion that the meeting adjourn.

May we express our sincere appreciation to the speakers, the management of the Manitonna Hotel, and our kind friends in Brockville, without whose contributions and co-operation our meeting would have been much less successful.

—OLIVE CASSELMAN, R.T.,
Kingston General.

CENTRAL SECTION

The third meeting of this season was held at the Royal York Hotel, Toronto, on Thursday, May 23rd. Mr. W. Page of the Toronto General Hospital gave an instructive paper on Pyelography. Mr. L. J. Cartwright of the Hospital for Sick Children followed with an interesting talk on Radiography of Children. Mr. Ken Hall of the Victor X-Ray Corporation gave an illuminating address on the Evolution of the X-Ray Tube. All these three papers were illustrated by lantern slides. Then Mr. C. G. Cameron of the Workmen's Compensation Board gave a very interesting talk, leavened with considerable humour, on the development and growth of the Board and the good work it has accomplished. The meeting concluded with a social get-together with music and refreshments. Some seventy members and friends were present, representing not only Toronto but most of the centres within a hundred mile radius.

- J. H. GUTHRIE, R.T.
Chairman.

ATTENTION: SERVICE PERSONNEL

The following Order of the Executive Committee of the Ontario Society of Radiographers applies to individuals without secondary school graduation and is effective until July 31st, 1947, unless otherwise restricted by a succeeding committee:

An application for Student Membership in the Ontario Society of Radiographers will be accepted from a member or ex-member of the Armed Forces regardless of the academic standing of the applicant, with the following provisions:

(a) The applicant shall be a resident of the Province of Ontario engaged in radiological technical work prior to July 1st, 1946;

(b) The applicant shall be employed under the supervision of and recommended by a recognized radiologist.

Registration under the above terms does not imply examination eligility or membership in the Canadian Society of Radiological Technicians for which application must be made independently.

—PAUL FREDERICK, Secretary.

QUEBEC SOCIETY OF X-RAY TECHNICIANS

FIFTH ANNUAL MEETING

The fifth Annual Meeting of the Quebec Society of X-Ray Technicians took place on May 18th in the Windsor Hotel, Montreal. Registration was from 9 a.m. to 9.30 a.m.

The meeting was opened by Dr. Albert Jutras, Radiologist of the Hotel Dieu Hospital and Dr. J. W. McKay, Radiologist of the Montreal General Hospital. Miss Donalda Campbell presided.

During the morning session, technical papers were given by Sister Therese Lea in French, subject — "Technique sur la Bronchographie." Dr. Bouchard, Radiologist at the Royal Victoria Hospital, "What a Radiographer should know about Roentgen Therapy." Mr. S. Weale, "Study of the Mandible." Dr. E. M. Crawford, Radiologist at the Homoeopathic Hospital, "The advantages of multiple positions to Radiologists with particular reference to the ankle." Sister Judith of Ste. Justine Hospital introduced the speakers.

Luncheon was served at 1.30 p.m. Dr. C. P. Martin, Professor of Anatomy at McGill University, was the guest speaker. Dr. Martin's lecture was on the study of Anatomy from the very early periods up to the present time. It was most interesting, educational and humourous, for no matter how serious a lecture Dr. Martin gives, he always manages to get in his Irish witticisms.

At the afternoon session Miss A. Muirhead of the Montreal General Hospital, Western Division, acted as chairman.

Papers were contributed by Dr. G. T. Adams, Radiologist of Ste. Anne's Military Hospital, subject — "The Unhappy Radiographer." Miss A. Paquin — "Le Trou Occipital." Mr. A. Cheffins — "Encephalography."

During the business meeting it was announced that Dr. C. B. Peirce, Chief Radiologist of the Royal Victoria Hospital, had kindly accepted the position of Honorary President and Advisor of our Association.

Election of officers for 1946-47 took place. President, Miss D. Campbell; Vice-President, Miss J. Pigeon; Secretary-Treasurer, Miss M. Wheeler; Assistant Secretary-Treasurer, Sister Margaret of Jesus; Executive, Sister Camille de Jesus, Mr. H. Simpkins and Miss R. O'Hagan; Convenor for the Blue Cross Insurance, Miss M. Reid; Press Convenor and Sub-Editor for The Focal Spot, Miss R. O'Hagan.

The meeting was brought to a close in the evening with a banquet. The guest speaker was Dr. J. E. Gendreau of the Radium Institute. Miss J. Harris and Miss Gravel had charge of the dinner tickets and they deserve a great deal of credit for the success of their efforts as we had an attendance of approximately ninety members.

It certainly made us all feel good to welcome back so many of our Radiologists and Technicians who had been in the Armed Forces. It was also nice to have Mr. Art Elsey of the DuPont X-Ray Film Company in Montreal at the time of our meeting.

After a friendly get-together once again our Annual Meeting was brought to a close.

We wish to extend our very best wishes to Miss Elizabeth Watson who was married last month and is now Mrs. Eric Langdon. Mr. and Mrs. Langdon expect to reside in Toronto in the early fall. Miss G. Phillips who was Senior Technician at the Royal Edward Laurentian Hospital, leaves shortly for Bermuda where she will be Technician in charge of the X-Ray Department at the King Edward VII Memorial Hospital. Our best wishes go with you, Georgina, for success in your new position.

Our student members who wrote the April Dominion Examination are still anxiously awaiting the results. Here's hoping they receive their marks before they depart on a well-earned vacation.

—ROSEMARY O'HAGAN, R.T.,
Sub-Editor.

SASKATCHEWAN SOCIETY OF X-RAY TECHNICIANS

A reorganization meeting of the Saskatchewan Society of X-Ray Technicians was held in Saint Paul's Hospital, Saskatoon, on May 12th, 1946.

The financial report was read and we find that we are in a fairly healthy position as regards money matters. We regret that Mr. James Connell has had to give up the office of Secretary. Many thanks are due to him for his valuable work duing the past trying years of the war.

Miss Marie Perron has assumed this office for the time being and we know all members will give her their loyal support.

The Dominion Secretary, Mr. P. E. Hunt, then presented the new form of application for membership which was approved by all present.

A committee was formed comprising Mr. Geo. Jackson as chairman, Mr. Mel. Smith and Miss Perron, to contact all members and those doing x-ray work in the Province, asking their co-operation and interest in the Society; to make it grow and prosper. Plans were made for the Annual Meeting sometime before the Canadian Society Convention in September.

Some discussion, too, regarding the Dominion Meeting should Saskatchewan be honoured with this big event.

Monthly meetings are to be resumed in Saskatoon, Regina and Moose Jaw commencing in September.

—S. G. JOHNSTON, R.T.,
Sub-Editor.

TECHNICIANS AVAILABLE

ERNESTINE FELTHAM, 21 Cottage St., Truro, Nova Scotia. (Maritimes only).

MARGUERITE HOVEY, 41 High St., Sherbrooke, Quebec.

N. E. LIDKIE, 1627 Bloor West (Apt. 11), Toronto. Phone LA 7836. Registered Technician, 3 years' experience.

HAROLD NORMAN MATTINSON, 43 Union St., Truro, Nova Scotia.

MARIE FERNANDE PAQUIN, 94 Regent St., Port Arthur, Ontario.

Cash for Used Films!

WE WANT TO BUY YOUR

Old X-Ray Films

Duplicate, discarded, out-dated films in any quantity are still

URGENTLY NEEDED

They are a valuable source of silver nitrate and cellulose essential for industrial purposes

We Pay Generously for Them!

Sort Them Out! **Do It Now!**

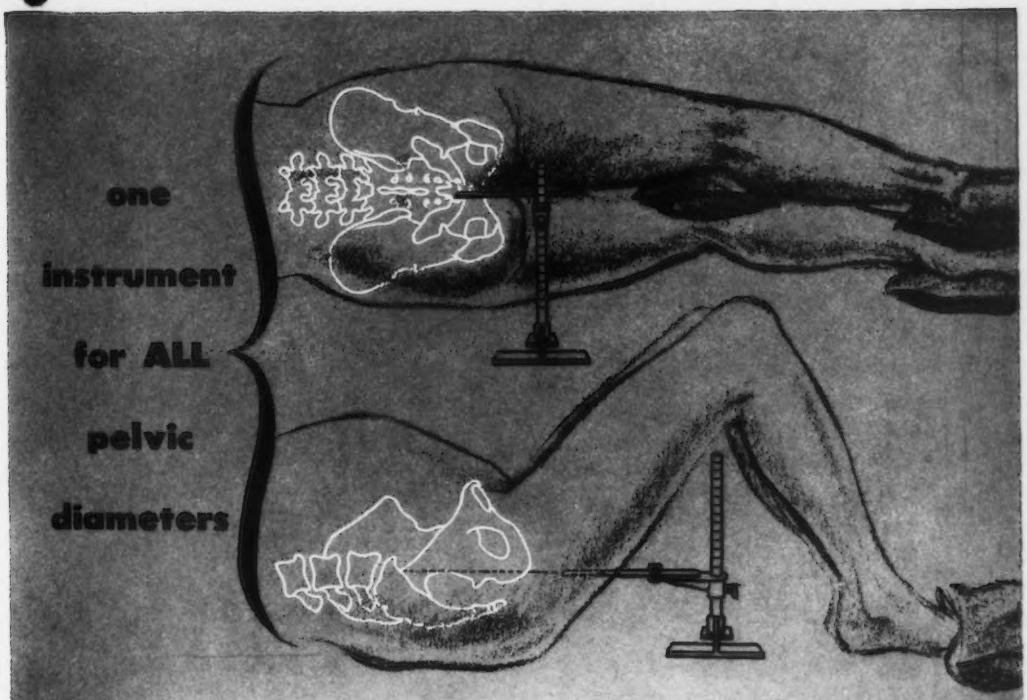
Write or wire the amount of film you have for disposal. We will remit a certified cheque before you ship. And we pay freight charges. Mention this advertisement.

DISCARDED FILM PRODUCTS

117 ST. PATRICK STREET, TORONTO, ONT.

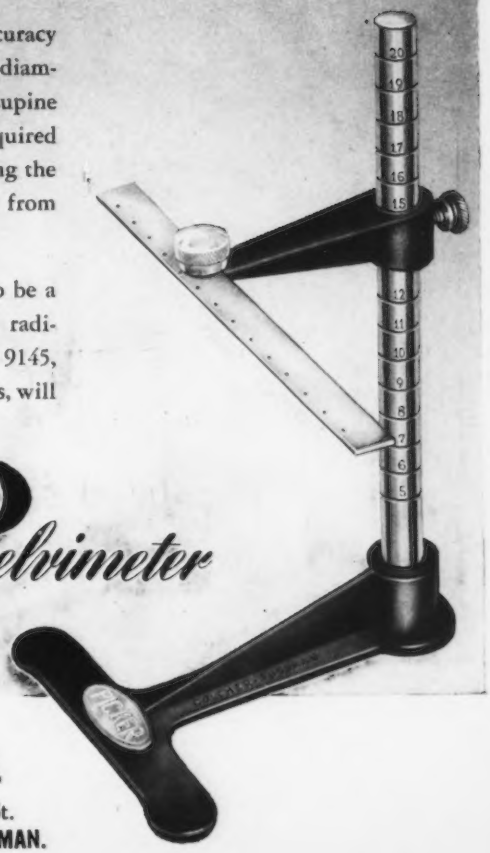
Office, ADelaide 4716 TELEPHONES Evenings, HUdson 5252

The Focal Spot is produced by The Seagers Press, Hamilton, Ont.



This ingenious device achieves directness, accuracy and facility in the measurement of all pelvic diameters. The patient lies comfortably in a relaxed supine or lateral position. No accessory devices are required for either positioning the patient or interpreting the radiograph. Measurements are read directly from the radiographs.

The Colcher-Sussman Pelvimeter will prove to be a valuable and time-saving tool for the busy radiologist and obstetrician. Picker bulletin No. 9145, describing its unique principles and applications, will gladly be sent on request.



THE COLCHER-SUSSMAN

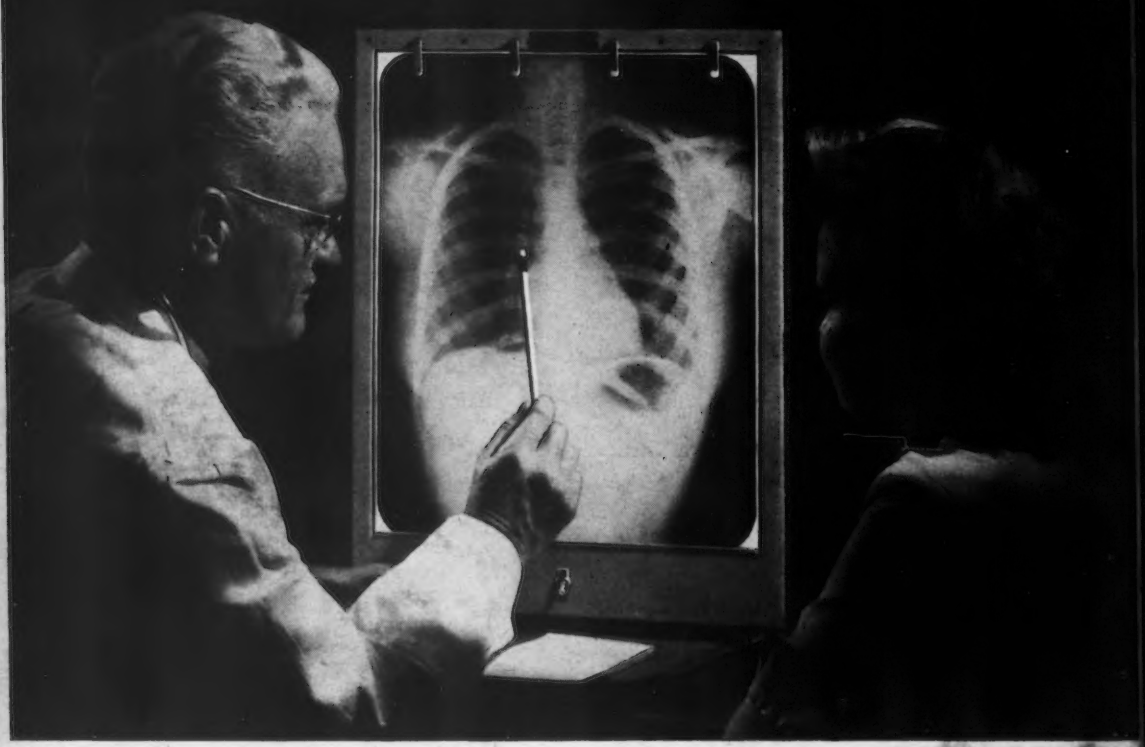
x-ray **Pelvimeter**

PICKER

PICKER X-RAY OF CANADA, LTD.

57 Bloor St. W. **TORONTO, ONT.**
3443 St. Denis St. **MONTREAL, QUE.**
120 Fort St. **WINNIPEG, MAN.**

Kodak



Need again in July, 47
Returned April 15/47 Baker cable

"You're the picture of health, Sally"

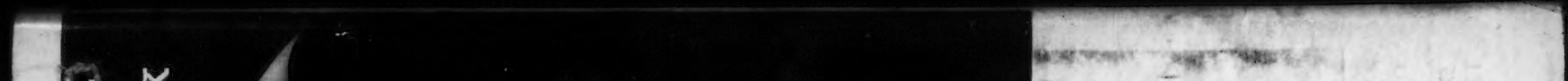
THESE "pictures" of Sally are filed, one by one . . . as a record of continuing good health and intelligent care.

Ever since she could toddle, Sally's parents have taken her periodically to the family physician for a complete check-up, including—for a few extra dollars—a chest radiograph by a competent radiologist.

There never have been enough parents like Sally's . . . with the knowledge and foresight to seek out possible disease while it can still be arrested.

Fortunately, 774,437 men and women who served in the war have learned the value of radiographic examinations. With the help of Canada's physicians, including those coming back into civilian life, these future parents will give their children the benefit of radiography's health-insuring service.

★ ★ ★

CANADIAN KODAK CO., LIMITED

Toronto 9, Ontario